Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
132nd Meeting
Wednesday, December 11, 2019

The meeting convened at 8:15 a.m., Pacific Time, in the Hilton Oakland Airport Hotel, One Hegenberger Road, Oakland, California, Ted Katz, Designated Federal Official, presiding.

Members Present:

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

Registered and/or Public Comment Participants:

Adams, Nancy, NIOSH Contractor
Barton, Bob, SC&A
Behling, Kathy, SC&A*
Blaze, D'Lanie
Buchanan, Ron, SC&A*
Calhoun, Grady, DCAS
Crawford, Frank, DOL*
Durso, Kelley, NIOSH
Kinman, Josh, DCAS
Lewis, Greg, DOE
Lobaugh, Megan, NIOSH
Marion-moss, Lori, NIOSH
Martz, Amy
Mcfee, Matt, ORAU Team
Montano, Eileen
Porter, Diane, NIOSH
Ringen, Knut*
Taulbee, Tim, DCAS

*Participating via telephone

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(8:23 a.m.)

Roll Call/Welcome

Mr. Katz: So, welcome, everyone. This is the Advisory Board on Radiation and Worker Health. We are on our Meeting 132, which is quite a big number.

We're here in Oakland and happy to be here. We're here in part because Board Members had a tour of Lawrence Berkeley National Laboratory, which I understand went well and we'll hear more about that later today from Dr. Ziemer, who chairs of that Work Group.

So, let me get through some preliminaries for the agenda today. First of all, for the people on the phone, the materials for today, the presentations, the background meeting today, those are all posted on the NIOSH website for this program under Schedule of Meetings, today's date.

You can go there and read all those background materials. You can follow along with the presentations. They're all posted there.

There is also, as you'll see if you pull up the agenda from the website there is a Skype link.

And if you want, you can watch the presentation as it's given in the room through Skype. That's all it does. It doesn't do any more. You can't speak to the group through Skype and so on. But if you want to do that you can.

Let me also mention that we have a public comment session. That comes at the end of the day, 5:30 to 6:30. So I would encourage people to be ready at 5:30 for public comments because the way we work this is we go right to the public comments and if we run through all the public comments at the time, we conclude. We won't conclude before 5:30, but we

could conclude at any point after that once we're through the commenters. So please join us at the beginning of the public comment session so you are assured to have your opportunity there. And we'll remind you of this later this afternoon again as well.

Let's see. So, I am going to run through roll call first because we need to have a quorum of the Board Members. We have a number of Board Members that are joining us by phone. So we'll run through Board Members.

Let me just speak to conflict of interest while we're at it too. We only have one agenda item today that relates to a conflict. That is one of the Oak Ridge sites and Jim Lockey is conflicted for that.

It's a procedure review, so if you'll just -- since it's just a piece of even that session you don't need to leave the table, Jim, for that. You just need to recuse yourself from that discussion. And that will work fine.

But otherwise there are no conflicts to address.

So let me run down the list alphabetically.

(Roll call.)

Mr. Katz: So we have a full house, which is wonderful. Thank you. And I think we're running a little bit late maybe already. Are we okay? Okay. That's great. Okay. Well, we're right on time. That's nice.

And with that, with no further ado, let's have a NIOSH program update from Grady. And remember, please speak right into that mike.

Ms. Adams: Ted, are you going to do people on the phone?

Mr. Katz: Oh, wait. Nancy, were you asking something?

(No response.)

Mr. Katz: Okay, go ahead, Grady.

Mr. Calhoun: Can you hear me? Yeah, I can hear it. Okay.

Mr. Katz: People on the phone, can you hear Grady?

Mr. Calhoun: Can you hear Grady on the phone right now?

Member Clawson: Yes.

Mr. Calhoun: All right, thank you. Okay.

Mr. Katz: Super. Thanks.

NIOSH Program Update

Mr. Calhoun: Okay. Good to be here this morning. Welcome to sunny California. Not so sunny, but. All right, here we go with this one.

Okay. Just to go over what we typically have gone through in the past: contracts and staffing.

I believe I spoke last time about we've got a new dose reconstruction contract in our outreach.

But since that time we did -- there we go. The worker outreach contract was awarded to ATL. They've had that in the past, done a fine job. So that's been awarded which is good.

We're in the process of replacing the health physicists who have left. Darn them. But as we know, Stu Hinnefeld, Jim Neton left and Pete Darnell left. So we have three vacancies.

We've hired one health physicist so far. Still working on two more to backfill the people that have gone.

We're well on our way with that, but there's always some bumps in the road when it comes to hiring.

As far as upcoming things and things that we've completed on workshops, town halls and other outreach activities, we held our dose reconstruction

workshop in Cincinnati. That's something that we do every year. It consists of advocates and several people in here have even attended that.

Pretty detailed two-day presentation about what we do and how we do it. And that's organized by ATL but most of it is conducted by DCAS staff and actually some of the ATL folks as well.

We had a town hall meeting in Bolingbrook, Illinois. ANL-East is the closest site to there. And that was just an information-providing session.

Upcoming outreach. We're going to -- or we did, it happened already. Amarillo. It didn't happen when I wrote these but it did now.

We had an outreach in Amarillo close to Pantex. That's another information-providing session that we had.

And we have an upcoming one here in February in Santa Fe. And that one is an authorized representative meeting combined with a Joint Outreach Task Group meeting. So that's a three-day meeting that's going to be held in Santa Fe in February. I'll be going to that one.

Some of just the current status reports that we go through.

Since August 14 we have a total of 51,576 cases and of those we have forwarded 49,524 to DOL. We have 1,000 in-house for DR, 909 have been administratively closed.

Of the ones we submitted to Department of Labor with dose reconstruction completed, we have 1628 were pulled by Department of Labor. And then we also had 3,535 pulled because they were in some way part of a new or existing Special Exposure Cohort.

We have 159 requests out to DOE. Outstanding doesn't mean they're not being responsive.

Outstanding just means that they're in the process of responding to that. And of those only 2 are beyond 60 days of our request for documentation.

Probability of Causation summary. Of the cases that we've sent for final adjudication, 44,361 total cases, 12,155 greater than 50 percent, 32,206 less than 50 percent.

Active cases with us. We have 1,139 at our shop for dose reconstruction: 384 are in the dose reconstruction process, 221 initial draft reports are with claimants to review and 534 cases we're just getting prepped for dose reconstruction, which means that we're accumulating data and whatnot.

This is something that I told you last time I was going to change up a little bit. And in previous meetings we've had reports on the first 10,000 claims, first 20,000 claims. And that's irrelevant now because those are done. They've been done for a long, long time.

So basically I just wanted to give you a little glimpse of what -- one of the things that's important to me in our shop and that's the age of cases. Because we always want to make sure that we're getting cases through our process as quickly as we can.

Some of you have been around long enough to remember that that was one of our biggest complaints from claimants is that it's just taking too darn long.

And so we're really trying hard to track the length of time that a case resides with our shop, and try and make that as efficient as possible.

You'll see we didn't start tracking this till 2012. But even back then that high peak is the six to nine months that they've been in our shop. That was in 2013.

And this is just an overall view of where we've come

from. What we have in 2019 which is a little bit more illustrative here is where we are just in the last -- since the beginning of the year.

You'll see that the little circles on the bottom, those are cases that have been in our shop for greater than a year. There's none.

And 9 to 12 months, it looks like there might be about 5 in our shop. And then the six to nine months, those are really the cases that are actively being worked with dose reconstruction being performed. And we've got about 40 of those in our shop right now.

So this is something, a report that comes out every week, something I like to keep my eye on because I want to make sure that we're getting the dose reconstructions out to claimants as soon as we can.

And actually we've been doing a pretty good job of getting them out in a more timely way. And I think that may be it. I think that may be it.

Mr. Katz: Last slide, you mean?

Mr. Calhoun: Yes.

Mr. Katz: Okay. Board Members in the room, do we have any questions for Grady?

Member Ziemer: Grady, on the DR workshops that you held in Cincinnati, or workshop, about how many people attend that and sort of what's the breakdown in terms of active dose reconstructors versus --

Mr. Calhoun: None of them are active dose reconstructors at all. I would say that there's probably between -- more than 20 people, probably 20 to 30 people.

We have a few repeat people that have come to a couple of them. They don't come every year. But it's a good mix of union representatives.

We've got people that are out there just trying to be kind of authorized reps for people. And it's really just a breakdown.

We go through the process from DOL to DOE to us. We actually go through individual dose reconstructions on how we do them. We explain overestimates, underestimates...

We get really good feedback from the people that attend those meetings. So it seems to be well appreciated.

Member Ziemer: And as a follow-up, the representatives, are a lot of these new people or ones that have returned just updating?

Mr. Calhoun: I would say, and I'm guessing here, but I would say that at each meeting 75 percent of them are new people that haven't been before. That's just a guess.

I do them all and so I kind of would recognize them. We do this once in Cincinnati every year, and then we do a traveling one once every year as well.

And that one is only one day when we're traveling. We kind of condense that a little bit to limit travel. But we do two a year.

Mr. Katz: Any other questions from Board Members in the room? David?

Member Richardson: Just a question. For the group that's not represented there which would be zero to six months, is it not -- am I understanding the picture right? There's another --

Mr. Calhoun: Oh yeah. Yeah.

Member Richardson: That would be way high up on the graph?

Mr. Calhoun: Yes, yes, it would be. But those are in the process where they can't be done. Most of those can't be done at that point because we're in the

process of requesting the information.

Once we get the request from Department of Labor then we've got to make the request to DOE for the data. We've got to wait on that data.

We've got to do the CATI with the people. So those really aren't even available to us to complete. So only until we get to the six to nine months is it able to be trackable and meaningful.

Member Richardson: Okay.

Mr. Calhoun: Good question though.

Mr. Katz: Any questions from Board Members on the line?

Member Clawson: No.

Mr. Katz: All right. Thank you, Grady. And we're on to DOL program update. Frank, Chris Crawford, are you on the line?

Mr. Calhoun: He is.

Mr. Crawford: Yes, I am.

Mr. Calhoun: I've got to get this going here.

Mr. Katz: Okay. He's setting you up, Chris.

Mr. Crawford: Thanks in advance to Grady for doing the slides for me.

Mr. Calhoun: Okay, Chris, I'm at slide number one.

DOL Program Update

Mr. Crawford: Great. Thanks, Grady. My name is Frank Crawford. I'm a health physicist with Department of Labor. And let's go to slide 2.

In this slide we see that the total compensation paid was $17.2 billion so far. That's $6.9 billion from Part B compensation, $4.9 billion from Part E compensation, and $5.4 billion in medical bills.

Also of note, we have over 211,000 cases filed so far. Next slide.

We have referred to NIOSH 52,390 cases for dose reconstruction. Of those 50,632 cases were returned to DOL from NIOSH, 44,150 with a dose reconstruction, 6482 were withdrawn from NIOSH with no dose reconstruction.

There are various reasons for this, SEC decisions, death of the remaining survivor, that sort of thing.

Then the last category here, there are 1758 cases currently at NIOSH by our count. I'm sure the NIOSH numbers are correct.

There are 1247 initial or original referrals to NIOSH, and 511 reworks or returns to NIOSH. Next slide, please.

Okay, here we have Part B cases with dose reconstruction and final decision. That would mean by implication at least that most of these cases are not SEC-accepted cases. A few, maybe.

We have 35,166 cases in this category with final approvals of 12,146 and final denials of 23,020. Next slide.

Then in Part B cases filed, we see that 35 percent of the cases were sent to NIOSH initially, and then there were some SEC cases that were referred to NIOSH, 12 percent of them.

Then there were SEC cases never sent to NIOSH, 15 percent of all cases.

There are 9 percent RECA cases which NIOSH also handles.

And then there are 29 percent other, mainly beryllium sensitivity, chronic beryllium disease and chronic silicosis cases. Next slide, please.

Now, all Part B cases with a final decision, and that will include SEC cases as well as cases with dose

reconstructions. We have 104,097 cases with final decisions and that includes 55,154 Part B approvals and 48,943 Part B denials. Next slide, please.

Our top four work sites are Nevada Test Site. This is for the last quarter. Savannah River Site, Hanford and the Y-12 Plant. These are more or less the usual suspects. Next slide, please.

These are SEC petition sites presumably being discussed one way or another today.

Lawrence Berkeley National Laboratory had 1,016 cases. And of those, 222 have received a dose reconstruction from NIOSH, 472 have gotten a final decision. Under Part B, 248 approvals and 247 Part E approvals. And the total compensation of medical bills paid so far, $67 million.

For the Savannah River Site, 19,882 claims to date, 5938 were returned by NIOSH with a dose reconstruction.

We have 8387 final decisions, 3619 Part B approvals, 4151 Part E approvals. And the compensation to date, $1.38 billion including medical. Next slide.

We do DEEOIC outreach events regularly. And these consist of town hall meetings and traveling resource centers. With smaller SECs we just do press releases. We also do quarterly medical conference calls and authorized representative workshops. Next slide, please.

The Joint Outreach Task Group is charged with helping with this outreach effort. The members, I don't know that we need to go through all of them, but I will just for protocol here.

The DEEOIC, the DOL branch, certainly Department of Energy, Department of Energy Former Worker Medical Screening Program, the National Institute for Occupational Safety and Health --NIOSH -- the Ombudsman to NIOSH for EEOICPA Part B, Denise

Brock, and DOL's Office of the Ombudsman for EEOICPA, Malcolm Nelson.

These include monthly conference calls as part of the effort and they conduct all town hall meetings. Next slide.

The upcoming outreach events. We have a town hall meeting which has already happened in Amarillo, Texas on December 5, 2019. Next slide.

We have a Kansas City, Missouri town hall meeting coming up January 20. I'm sorry, January 9, 2020. Next slide.

And we have another town hall meeting, Santa Fe, New Mexico, February 25 through 27, 2020. And next slide.

And a final town hall meeting, St. Petersburg, Florida for March 2020. Don't have a date yet, exact date. And that would be the town hall meetings for the fiscal year Q1. Sorry, Q2.

And that concludes the presentation. There's more on the NIOSH website containing routine information about survivors and benefits and that sort of thing.

Any questions?

Mr. Katz: Thank you, Chris. Those are the meeting locations. You always make those cities look so beautiful. It's a wonder.

So, Board Members in the room, do we have any questions for DOL? David.

Member Richardson: Does DOL do any form of sort of actuarial projection about the number of claims they're anticipating over the next year, or five years, or decade?

Mr. Crawford: Not as far as I'm aware, but I'm not sure. May I ask again who's speaking? I'll get back to you on that if you wish.

Member Richardson: David Richardson.

Mr. Crawford: Thank you, Dr. Richardson. Yes, I'll check into it. I'm just unaware personally of any such projections.

Member Richardson: I was looking back over the presentations that we've had and the ones that I can keep track of.

And going back, for example, in 2011 there had been a total of $7 billion, $7.5 billion in total compensation paid.

One quarter later in January 16, 2012 it was $7.7 billion, so $200 million in addition.

Yet it seems to be accelerating now. So if we jump forward to today there's been an additional $10 billion in compensation over the next 28 quarters. So the compensation now, it's increasing by about $360 million per quarter.

And I'm just wondering if you have projections on this and anticipated trends.

Mr. Crawford: As I said I don't have anything at my level, but I can ask about it. It does -- just from my personal experience with DOL it does seem like the Part E part of the Act is ramping up steeply, unlike the Part B where we have a probably diminishing number of claims, and more importantly a diminishing amount of dose for most workers as the older workers roll off in a sense because the big doses were incurred in the forties and fifties.

So, I hope that helps a little, but I will get back to you on any projections that we do have.

Member Richardson: Right. I agree with you, there's two components there. There's one is the actuarial calculation will tell you about the number just of claims coming in. Some consideration of the dose would lead you towards compensation for the radiologically associated cancers, which is more

difficult.

But just in terms of even getting a sense of where you are in the kind of claims projection itself would be useful.

Mr. Crawford: Very good.

Mr. Katz: Good question. And Chris, you can just send that response when you have it to Grady's group and I'll get it distributed to the Board.

Mr. Crawford: Great. Will do.

Member Ziemer: Frank, this is Paul Ziemer. I have a question that perhaps is also one you might not be able to answer right away.

I believe I'm correct in assuming that Department of Labor has a process where final decisions can be appealed. I don't think we've ever had a report on how often this happens and what the results are. Can you give us some idea of how frequently people appeal the final decision that they get from the Department of Labor and what the success rate is?

Mr. Crawford: That would be difficult to do offhand. I see a fair number of those on the Part B side. So it does happen and it's not infrequent.

Usually the appeals occur at the recommended decision level because a hearing can be held if requested by the claimant and at that time we will respond to any technical objections and that sort of thing.

So after the final decision pretty much there has to be new evidence of some kind for a chance, in other words, of having the case reworked or accepted.

The exact numbers I couldn't give you yet.

Member Ziemer: All of those go through Labor. We don't ever see that I don't think, but I was just curious.

Would it be possible just to give us some idea of the frequency and the outcomes? Maybe in the next report or in the interim if it's feasible.

Mr. Crawford: Well, I can send this information when I can get it to Grady and NIOSH as well for posting if that helps.

Member Ziemer: Thank you.

Mr. Katz: Yes, I think that would be very interesting. And Chris, if you can break that out I think the Board would be particularly interested in also breaking out the proportion of those appeals that are specifically about the dose reconstruction versus other reasons for the denial. That would be great.

Mr. Crawford: Right. In other words it's the Part B radiation cases that are of primary interest.

Mr. Katz: Not just Part B. But I'm saying Part B cases where the reason for the appeal is dose reconstruction versus other matters that get appealed.

Member Ziemer: Yes, exactly.

Mr. Crawford: Oh, of course, of course. Yes, cases are reopened for lots of other reasons including new cancers.

Mr. Katz: Yes, I don't mean reopened. I mean appealed and denied, because we're interested in the denials.

Mr. Crawford: Right.

Mr. Katz: You got it? Okay, thanks. And if you have any questions about this you can email me and we can communicate more about it. Thanks. Thanks so much, Chris.

Any other questions from Board Members in the room? Good questions. How about from Board Members on the line? Okay then.

So, DOE is up next. Greg, welcome.

DOE Program Update

Mr. Lewis: All right. Good morning, everyone. I'm Greg Lewis with the Department of Energy Office of Worker Screening and Compensation Support.

I don't have any particular new news or information with respect to my office so I'll get into the presentation.

And also I'm going to go through this fairly quickly because a lot of these are sort of the usual items.

But if anyone has specific questions on these items please stop me and then I'll also leave plenty of time at the end for questions.

Okay. So again, our role within the Department of Energy is to provide records. That's what we do for the program, both to NIOSH and to DOL.

We do that in primarily three ways. We respond to individual requests. We provide support for large-scale records research projects like SEC research and Site Profile, Technical Basis Document updates, things of that nature.

And then we also conduct research into different covered facilities if there's concerns that they may be inaccurate or need to be updated.

I'll go over some statistics. These are FY2018 statistics. If this meeting were a couple of weeks later I would have had the 2019 statistics, but I'll have them for our next meeting.

And our 2019 numbers are more or less pretty similar to our 2018 numbers both in terms of volume as well as timeliness.

So in 2018 we responded to 16,432 records requests for all of our DOE locations. That doesn't really represent unique individuals because again we're going to get a request from Department of

Labor for the employment verification as well as what we call the DAR which has all of -- they want everything, anything attached to that individual, medical, IH, radiological information.

And then we're also going to get a request from NIOSH as well so there might be three different requests on any one individual.

We had a 98 percent on-time response rate last year or in FY18 I should say which I think was our best performance to date.

Many of our sites had a near perfect record, zero responses late out of over 1,000 or close to 1,000.

And again in 2019 that trend continued. We were pretty close to that 98 percent. I mean, we'll see when the numbers all shake out, but I believe we're very close to that number.

So the large-scale records research projects. We're working with NIOSH, ORAU and SC&A on a number of requests now.

I think the biggest project we have going on right now in terms of the level of effort on the DOE side is probably Los Alamos. There's been a number of visits and records requests that we're responding to.

But there's also a number of projects ongoing with other sites as well.

For all of those and for even some of the individual claims depending on the site, there's a need for the review of those documents both for classification as well as when needed for public release.

The classification review for reports typically takes less than 10 working days. The classification review for source documents which those documents can be 50, 100 or more pages, that can take considerably longer, particularly when there's -- after NIOSH or ORAU or SC&A go on a site visit there could be a request for hundreds of documents

and many of those can be quite lengthy.

So that can take months or more depending on the type of request. But we try to work with the site to get those back out to NIOSH and the requestor within a reasonable time frame.

We also try to work to prioritize when necessary. So if there's a large request we can try to have the requestor kind of order them in terms of importance and we'll work through it that way.

And we'll also check back so they can be reordered if there's follow-up visits or reports or things that kind of jump to the top of the list. We'll work it in whatever order the requestor would like and we try to do that as expediently as possible.

I mentioned the facility research. And there's actually quite a few facilities that we're looking at right now in concert with DOL and NIOSH.

And then outreach. Everyone has mentioned the Amarillo meeting and Chris gave a good update about the meetings to come. So we do attend those outreach meetings.

And then I always mention our Former Worker Medical Screening Program which is, again, not directly related to the compensation program, but it's -- I kind of consider it a sister program or almost a feeder program where former workers are eligible for a screening that are provided through cooperative agreement holders funded by DOE.

All former federal and contractor and subcontractor workers at DOE sites are eligible for this program. It's free. We can provide a screening close to their home.

And these screenings are evaluated by occupational medical physicians that are familiar with the sites and the possible exposures that these workers might have encountered.

And we also in some cases are able to provide a letter that helps that individual establish the work-relatedness of their condition and that can be useful for an EEOICPA claim.

And there's some information about our former worker programs and how you can get in contact with them.

And that's all I had for the presentation. I'd be happy to take any questions.

Mr. Katz: Thanks, Greg. Questions from Board Members in the room.

Member Beach: Greg, I know NIOSH is waiting for some documents to be released from LANL. Any update on how that's going?

Mr. Lewis: I mean, I don't have a specific update on the documents. If you gave me more information about them I'd be happy to give you an idea of the schedule.

I know that the work there has been fairly aggressive in terms of the number of visits and I believe there's a deadline of, I think, February. I think there's a goal of kind of finishing up the site visits and getting most of the information by February.

We're doing our best to meet that goal.

I think there was an issue recently where some documents were delayed, but my understanding is that was more of an issue of personnel and staffing at the lab not being -- vacations and different people kind of being out.

But I know that that work is in general progressing. So we are working through the different document requests for facilitating site visits.

I haven't heard of any sort of major issue that would derail that project.

Member Beach: Thank you.

Mr. Katz: Thanks, Josie. David.

Member Richardson: Thank you for the presentation. And I agree, it's things that we've heard but there continue to be issues that I puzzle over and I think it's just my limited background.

DOE frames its responsibilities, one of the key ones that was up here was responding for requests for information related to claims that might include employment verification and exposure records.

So that would be the type of material that would impact on the Board's understanding of how decisionmaking happens with respect to the program.

That was presented up there as DOE's responsibility. When one encounters an instance in which there are -- questions might be raised about the accuracy or completeness of information which is provided to a claimant in terms of either employment verification or exposure records is that -- legislatively where does that fall when DOE would not, let's say a claimant would feel they hadn't met those responsibilities?

And does the buck ultimately stop with DOE, or does DOE turn to those contractor organizations? What is the legislative responsibility or act that would cover record-keeping and record provision?

I guess despite the fact that I've been trying to understand the program for over a decade, I don't quite know where the buck stops.

Mr. Lewis: So, if I'm understanding your question correctly, I mean, it can get a little bit tricky with the relationship between DOE and the contractor and particularly the subcontractor.

So under the legislation as far as I understand DOE is responsible for providing the records that DOE

owns and has a right to.

So typically for our prime subcontractors, there's no confusion about that. The prime contractor manages the records on behalf of DOE, but DOE owns those records.

In some cases historically the flow down to the subcontractor may not have been there in terms of personnel records, or things that DOE kept.

So a sub might have been hired by the prime. They would have come on, done their work and in terms of the formal employee record that prime contractor would not have kept that record and would not have had a right to.

The way the contract was set up the record would have stayed with the employers, a plumbing or construction company or whatever the case may be. Those are typically the ones where we run into those issues.

Now, that doesn't mean we necessarily have nothing on that individual. What we'll do within DOE is try to check for any, again, not a typical employment record, but any kind of tertiary information that we may have on that individual.

So if the person was hurt onsite we're going to look for a medical record. They don't always go to the site medical clinic, particularly if they're a sub so we may or may not have that record. Or the person may not have gotten hurt so we may not have that record.

If they wore a dosimeter or had any kind of radiation monitoring we should have that record. But again, particularly with construction, if it was a new build or something they may not have been badged. So, we may or may not have that record.

So we do go to those secondary sources to try to find everything we can.

We've also done some things to try to make sure that current subcontractors have to maintain those records or turn them over to DOE when they leave.

So we have an access to an ownership of records clause that's supposed to be included in certain contracts, whether it might be a health and safety connection.

So we have done some work in the last 10 or 15 years to try to ensure that DOE has more of a right to current subcontractor records in particular.

But essentially the records that we try to obtain are those that are currently held at DOE sites by the DOE contractors.

And of course for the prime contractors as they turn over, those records would remain with the next prime contractor because they're DOE-owned records.

So those are the records that we're able to go after.

Member Richardson: So DOE for the prime contractors and in more recent years for subcontractors, views -- it's the ownership of the employment -- the records used for employment verification and dosimetry, views its status as the owner of those records.

It has responsibility for record-keeping and reporting of those records. And if there was -- if there are problems in the completeness, accuracy of those, those -- the buck would stop with DOE because those were records which they legally had ownership for and responsibility for reporting for the keeping and reporting back through this program.

Mr. Lewis: Yes. And I think the key part of that is what we had legal ownership of because it can depend on the site and the particular contract.

So those contracts are structured based on the work that the company is doing. So I'm not going to say

that DOE has legal ownership of all records created in relation to a site. There's vendors, there's consultants, there's sort of a lot of different contractual relationships.

But in that contractual relationship -- I'm going to say for all prime contractors and for most of the larger subcontractors, the subcontractors that are doing work that might encounter any health and safety issues, we believe we have it set up where we should have ownership rights these days.

But again, going back that's not always the case.

Member Richardson: But in instances where there were let's say larger systematic gaps, or failures of reporting the football shouldn't be punted back to the contractor or historical contractor which may not exist anymore.

That would be viewed as those were records which DOE had responsibility for record-keeping and for currently reporting on.

And it would be the DOE that a claimant or Department of Labor or somebody should turn to.

Mr. Lewis: Yes. If I'm understanding you correctly, yes.

But again, we can only provide the records that we have. So if for whatever reason records were not turned over when a contractor left historically, or there are gaps in the records, whether records weren't created that should have been, or records were destroyed that shouldn't have been.

I mean you guys are well aware of those issues because they play into a lot of the SEC decisions of course.

What I usually say is within DOE we do the best we can to find all of the records we have. If we don't have it, we can't recreate it unfortunately. So we do the best we can to find the records that are still in

our possession.

Member Richardson: Thank you.

Mr. Katz: Thanks, David. Other questions from Board Members in the room? How about -- oh Paul, go ahead.

Member Ziemer: Greg, I have one question about the medical screening program which we now say there are occ med physicians available to all former workers close to their homes, I think is the term used. Locations close to their residences.

And I'm wondering what that means, how close. Let's say they don't retire near where they worked. Let's say someone from Oak Ridge decides to retire, say, in Corbin, Kentucky or I don't know, some little, remote place.

Mr. Lewis: Sure.

Member Ziemer: I hope I'm not insulting people from Corbin. It just popped into my mind. But how close can we find an occ med physician or someone has to go more than x miles to get that care.

Mr. Lewis: So that's a good question and let me clarify a little bit. So, occ med physicians will evaluate the results of their screenings.

(Simultaneous speaking.)

Member Ziemer: I gotcha. Okay.

Mr. Lewis: So in some cases the occ med physician actually will be there for the exam, but for most of our programs they're going to go to a clinic and our programs will have a relationship with that clinic and say here's what we need done, and we need it done a certain way.

And a lot of times they'll audit those clinics to make sure are they doing things the right way. Are the results that they're getting up to par compared to the other clinics?

So they're going to get the results. And then the results are evaluated by that physician.

And of course we have an initial interview somewhat similar to the CATI where staff in the former worker program are going to talk to that individual, what did you do, where did you work, what were you exposed to, did you do this, that and the other. And they have kind of a list of questions.

A lot of people say they worked here. Did you do that. They have some prompts to kind of help them remember.

So they'll go through that interview so the occ-med physician that evaluates it will have that interview from the worker, they'll have the results of the screening and they'll also have that -- that occ-med physician will have a background knowledge of the site.

They have something somewhat similar to a Site Profile they put together on each site so they kind of know the general hazards and what went on at that site. They visited the site, talked to people.

That way they'll be able to look at the interview, the results and use their knowledge of the site to kind of put those together to try to come up with some recommendations or some findings as far as possible work-relatedness when they can. But the occ-med physician is not necessarily near their home.

But in terms of distance we have relationships with clinics. So we have done people most likely in Corbin, Kentucky, although I'm not sure.

We've done I think a few folks even in Canada. We've kind of gone all over the place because we do have relationships with clinics nationwide.

Member Ziemer: Sounds good. So someone can retire to Hawaii and still be covered.

Mr. Lewis: Yes. You retire, we'll find somewhere near you.

Member Ziemer: Thanks.

Mr. Katz: Thanks, Paul. Board Members on the line, any questions for Greg?

Member Schofield: Yes, this is Phil Schofield.

Mr. Katz: Hi, Phil.

Member Schofield: I've got a question. What is a person who's having difficulty getting their records from a site -- who would they appeal that to or address?

Mr. Lewis: Well, I mean for starters they can contact me. I get contact from individuals or authorized representatives or advocates or DOL or NIOSH.

So I'd be happy -- you can go directly to me and I can work through my contact at the site. I also have site contacts so I'd be happy to help troubleshoot if there's some issue.

And we do that quite frequently. And we have a pretty rigorous process at these sites where they've been doing this for 15 years now so they generally have a pretty set process and there is some QA/QC. Errors -- things are missed on occasion and errors are made like in anything else where there's 16,000. So if an individual thinks, wait a minute, this can't be right, or this doesn't look like my records, or this isn't the complete record let us know and we'll see if -- we'll go back, make sure that we followed our process and then make sure is there anything else that we think we might be able to do to find a record, find any missing records.

So you could go directly to me.

Member Schofield: Okay, thank you.

Mr. Katz: Thanks, fellows, good question for the

public in particular. Other Board Members on the line?

(No response.)

Mr. Katz: Okay, then. So we're trotting along pretty much on schedule here which is great. Next we have three completed dose reconstruction procedure reviews from the Procedures Subcommittee.

And I have on here John Stiver from SC&A as the main presenter. Josie Beach is the chair of that Subcommittee. Something came up for John. Things happen, as they say.

So I think we're having Kathy Behling who is the lead with SC&A anyhow for these. And Kathy, are you on the line?

Ms. Behling: Yes, Ted, I'm on the line.

Completed Dose Reconstruction Procedure Reviews

Mr. Katz: Super. So Kathy, Grady is going to search desperately for the presentations.

Ms. Behling: Will we start with the first one listed on the agenda?

Mr. Katz: It's up to you, it doesn't matter, but I have external dose reconstructions as the first one. Is that what you're ready to present first?

Ms. Behling: That's fine. If Grady can find the slides, I'm ready to present.

Mr. Katz: Okay, okay.

Ms. Behling: Thank you, Grady.

Mr. Katz: Thanks. We'll let you know when they're up.

Mr. Calhoun: Don't thank me until I find them.

Mr. Katz: Can you see the slides? Are you watching

from Skype?

Ms. Behling: Yes, I can.

Mr. Katz: Okay, super.

Ms. Behling: Okay. And hello, everyone. Wish I could be there.

Mr. Calhoun: So am I looking for something titled External Dose Reconstruction?

Ms. Behling: Correct. It's OTIB-88.

Mr. Calhoun: Okay, OTIB-88. Gotcha, that will help me. If you see it, yell stop. There it is. Got it.

External Dose Reconstruction

Ms. Behling: Okay. It's still loading on my screen. There we go. All right. Okay.

The first OTIB that we're going to discuss today is the external dose reconstruction OTIB.

And if we go to Slide 2 OTIB-88 is the technical information document for external dose reconstruction.

And it was issued in September of 2018 in order to convert it from what was previously a procedure. It was ORAUT-PROC-6.

And that -- it was the desire of NIOSH to convert that into an OTIB.

The OTIB also incorporates guidance regarding the assignment of onsite ambient dose in order to ultimately cancel their PROC-60 which is their occupational onsite ambient dose reconstruction for DOE sites.

Rev 1 of this OTIB was issued in October of 2019 and that was to correct an error in Attachment A which we'll discuss in more detail a little later, and also to add an attachment to provide dates when DOE sites incorporated ICRP recommendations for

neutron weighting factors.

SC&A was actually tasked to review Rev 0 and we submitted our review in January of 2019. This review resulted in no findings, but there were two observations.

And if we move onto the next slide, that will give you a description of Observation 1. Slide 3.

I'll start to explain it if that's okay. Slide 3 shows Observation 1 which states that OTIB-88 does not incorporate informative guidance that is included in PROC-60 Attachment A which is the external onsite ambient dose -- I'm sorry, you okay?

Mr. Calhoun: I'm sorry. There we go.

Ms. Behling: There it is. Okay, thank you.

So the observation was to state that OTIB-88 doesn't include the attachments that were part of PROC-60. And those attachments are Attachment A which is the external onsite ambient dose assignment for monitored site employees.

There's an Attachment B, maximizing dose summary. And Attachment C, methods for assigning site-specific best estimates of external onsite ambient doses.

And when SC&A does our reviews and our blinds we use these attachments frequently and find them to be very useful.

We also think that it helps the dose reconstructor to conduct their DRs in a consistent manner. And so that became our first observation.

In response to that observation NIOSH indicated that the information won't be lost, but it will be incorporated into other procedures and likely site-specific Technical Basis Documents.

But they did state that it might be better to keep it all consolidated in one document and asked if they

could give that some thought.

The Procedures Subcommittee found that NIOSH's response was acceptable and closed the observation. However, they did request that NIOSH inform the Committee about their decision as to where this information would reside.

Subsequently NIOSH did determine that after PROC-60 goes away the attachments and the information in those attachments will be incorporated into the site-specific Technical Basis Documents.

And then onto Observation 2, Slide 4. Slide 4 shows that observation 2 which identified an error in the example calculation that was provided in Attachment A of OTIB-88.

There are instructions for the dose reconstructor as to how to calculate the 95th percentile missed dose. And those instructions are correct. However, underneath that is an example calculation and the instructions state that the 95th percentile should be calculated based on multiplying the number of zeroes by the LOD value. However, the calculation below it actually uses the LOD over 2 value for calculating that 95th percentile. We pointed this out to NIOSH and they agreed that the sample calculation was in error. They subsequently published Rev 1 which we discussed earlier and that corrected the error in the calculation, the example calculation in Attachment A.

And the Procedures Subcommittee agreed with NIOSH's corrective action and they closed the observation at the February 13, 2019 teleconference.

And that sums up OTIB-88. Do you have any questions?

One other thing I might mention, I'm sorry. I think Ron Buchanan is the SC&A person who did this review.

I believe he's on the line and if he has anything to my presentation perhaps we can give him an opportunity to do that.

Mr. Katz: Ron, are you on the line?

Mr. Buchanan: Yes. This is Ron Buchanan with SC&A.

No, Kathy did a fine job, summarized it well and I didn't have any other additions unless there's any questions.

Mr. Katz: Super. Thanks, Ron. Any questions from Board Members in the room? How about from Board Members on the line? Any questions? This is a pretty straightforward one.

(No response.)

Mr. Katz: All right. Well, one-by-one we're going to take these. The Board has to put these to bed which means the Board has to vote on closing the reviews. So let's -- if you're ready we'll run down the list.

So the motion of the Board is to close the review. And I think at this point there's no need for discussion. There no questions, comments about the review so I will run the gamut alphabetically.

Anderson?

Member Anderson: Yes.

Mr. Katz: Beach?

Member Beach: Yes.

Mr. Katz: Clawson?

Member Clawson: Yes.

Mr. Katz: Field?

Member Field: Yes.

Mr. Katz: Kotelchuck?

Member Kotelchuck: Yes.

Mr. Katz: Lockey?

Member Lockey: Yes.

Mr. Katz: Richardson?

Member Richardson: Yes.

Mr. Katz: Roessler?

Member Roessler: Yes.

Mr. Katz: Schofield?

Member Schofield: Yes.

Mr. Katz: Valerio?

Member Valerio: Yes.

Mr. Katz: And Ziemer.

Member Ziemer: Yes.

Mr. Katz: And all are in favor, it's unanimous so we completed this review. And we're on to the next one which is external dose for K-25. Grady will be hunting to pull that up, Kathy, so just hang in there. Oh, it's up. Great.

So Kathy, it's ready for you.

Ms. Behling: Okay. Okay, I'm ready. Okay, this is ORAUT-OTIB-0026 and that's the external coworker dosimetry data.

Mr. Katz: Kathy, stop. Something is funny with your audio. I don't know if something changed, or maybe everyone else on the line mute your phones.

I don't know what's going on, but your voice is funny. Can you try it again?

Ms. Behling: Okay. Is that any better?

Mr. Katz: There's something odd about your mic.

Has anything changed in your room?

Ms. Behling: No, it hasn't, but if you want I can switch phones. Is that better right now?

Mr. Katz: Yes, it is. Thanks.

Ms. Behling: Okay. If that changes let me know and I'll try to make an adjustment here.

Mr. Katz: That's good now, thanks.

External Coworker Dosimetry Data for the K-25 Site

Ms. Behling: Okay. Again we are discussing now the ORAUT-OTIB-0026 and that's the External Coworker Dosimetry Data for the K-25 site.

And slide 2 tells you that the OTIB-0026 is obviously an external coworker model for K-25.

And this OTIB provides the dose reconstructors with guidance to assign external dose to the K-25 workers who have limited or no monitoring data. And this coworker model is based on data from the site and from other monitored workers.

The document was initially issued in May of 2005 and a page change revision was incorporated to modify calculations and use of the coworker doses. And that was issued in July of 2005.

A second page change revision was issued in November of 2006. And this revision incorporated guidance from OTIB-0052 which is the OTIB for processing claims for construction trade workers.

SC&A was tasked with reviewing Rev 00 page change 2 and submitted its review in October of 2007. And this review identified three findings.

If we move onto slide 3, finding 1 has to do with professional judgment which comes up routinely. This finding is concerned that the dose reconstructors were required to make too many judgments regarding whether a worker should be

assigned doses based on onsite ambient dose, 50th percentile coworker dose, or 90th percentile coworker dose. SC&A was recommending that the OTIB provide more prescriptive approach that enables categorizing workers without the need for excessive professional judgment.

NIOSH's response was that professional judgment is part of the process to categorize a worker's potential for exposure and that it would be difficult to provide detailed prescriptive guidance due to a wide variety of data and information that is available to the dose reconstruction staff.

NIOSH also stated that there is another OTIB, a more general guidance, OTIB-0020 that provides guidance for the application of coworker doses.

And then finally NIOSH stated that any assumptions that are made with regard to professional judgment should be recorded and documented in the dose reconstruction report and they would be subjected to both an ORAU and DCAS peer review.

And so based on NIOSH's response SC&A agreed with that response and recommended to the Subcommittee that this finding be closed.

The Subcommittee also found NIOSH's response to be acceptable and they closed the finding at the December 9, 2008 teleconference.

If we move on to finding 2, this finding states that only a select number of dosimeters prior to 1980 that were issued at the K-25 site were actually processed. And therefore the entire coworker database was based on doses from an unknown group of presumably higher exposure workers coupled with a large component of missed doses.

So NIOSH has responded by stating that they did a comparison of the OTIB-0026 data with K-25 data and analyzed these data sets using a maximum likelihood method that's described in section 7 of OTIB-0020. And this comparison shows that OTIB-

0026 data was very claimant-favorable. That was presented to the Procedures Subcommittee and they asked SC&A to look into this comparison a little bit further.

And so SC&A analyzed the coworker data in OTIB-0026 to evaluate whether the doses reported in the 1975 through 1980 time frame -- this is the time frame when most of the employee records were recorded, to determine if there were significant differences in the data reported in the earlier periods, 1945 through 1975 when only selected monitoring results were recorded.

SC&A conducted that analysis and concluded that the coworker data recommended in Table 2 of OTIB-0026 would provide for reasonable and likely claimant-favorable external doses for the K-25 unmonitored workers. And based on that recommendation the Procedures Subcommittee closed the finding at the May 16, 2016 teleconference.

And lastly, finding 3. Finding 3, it identifies that the derivation of shallow dose as reported in Table 2 of the OTIB resulted in zero values for 19 of the 24 years that are addressed in that table.

This was considered unimportant because IREP -- by this OTIB because IREP automatically assigns a penetrating dose to the non-penetrating input. And SC&A questioned if this assumption would change if NIOSH modifies IREP in the future.

NIOSH's response to this finding was that -- OTIB-0026 states that the approach is technically appropriate at this time. And they also stated that any future change to the IREP data input method would result in a wide-ranging revision to many OTIBs and Technical Basis Documents.

Based on that response SC&A agreed and recommended closing the finding. And the Procedures Subcommittee agreed with SC&A and NIOSH's response and closed the finding at the

December 9, 2008 teleconference.

And that's the final finding for OTIB-0026. Any questions?

Mr. Katz: Thank you, Kathy. Okay, then. Board Members in the room, do we have questions for Kathy? Paul?

Member Ziemer: Just to clarify. So there were just three findings on this document then.

Ms. Behling: Correct.

Member Ziemer: The three that you covered, that's everything that would be open otherwise.

Ms. Behling: Correct.

Member Ziemer: Or that are now recommended for closure. Thank you.

Mr. Katz: Bill? Okay. Kathy, we're going back to finding 2.

Ms. Behling: If someone's asking a question I don't hear it.

Mr. Katz: It's not -- we haven't asked the question yet. We're going back to the slide first.

Ms. Behling: Okay.

Mr. Calhoun: Which finding?

Mr. Katz: Finding 2.

Mr. Calhoun: There we go. Finding 2.

Mr. Katz: Bill, bring the mic to your --

Member Field: How's that?

Mr. Katz: I think that's better.

Member Field: Okay. I just had a question about the second to last bullet where it says they concluded the data -- recommend Table 2 but provide a

reasonable, and likely claimant-favorable.

I'm not sure what reasonable means, but is there reason to think it would not be claimant-favorable?

Ms. Behling: No, I don't believe so. Those were the words that were put into the report that was done or the analysis that was done that it was likely claimant-favorable.

NIOSH concluded that it was very claimant-favorable, but based on our analysis we feel it was reasonable and likely claimant-favorable. I'm sorry I can't answer it better than that.

Mr. Buchanan: This is Ron Buchanan. I think I worked on that some. I didn't do the whole --

Mr. Katz: Ron, we can't hear you. Sorry.

Mr. Buchanan: Okay. Can you hear me now?

Mr. Katz: Yes, that's better. Thanks.

Mr. Buchanan: Okay. I worked on that some. I didn't work on the whole report. I worked on some of the analysis. And what we wanted to distinguish there. We did some charting of that information and it looked like that the claimant for the previous data was covered and we felt that it was claimant-favorable and in some cases more than claimant-favorable. However, we just were distinguishing between very claimant-favorable and likely claimant-favorable. We didn't feel that it overdid it, but it provided a reasonable margin of error.

Mr. Katz: David.

Member Richardson: I'd like to stick on finding 2 because it seems like a largely conceptual problem.

The statement is that -- when did K-25 operations start, like 1950? Well -- and ceased around 1985. So and the statement is until approximately 1980. So essentially up until very late in the operations few dosimeters issued were processed, thus the

entire database for coworkers was based to a great extent on an unknown group of presumably higher exposure individuals coupled with the large component attributable to LOD over 2. So the proposed coworker estimation model for the vast majority of the period of operations for external exposures is based on this sample of a small number that were processed.

And then I recognize that in the recent years, and there's some discussion about whether the dosimetry is essentially complete from perhaps the mid to late 1970s forward. And that's where this validation is going to happen.

So it's an imputation of the external exposures for the workers from the period of the fifties up to at least let's say the mid-seventies when it's largely incomplete or sporadic and clearly not a random sample. And the coworker model here is going to use information from the same site, but now extrapolating over decades of operation.

So the validation that was done, help me to understand. Was there information used on department and area or job, or is it just that you're looking at whether an imputed value for the average worker in the facility in an earlier historic period was estimated reliably by this coworker model which is derived on later periods? Is it facility averaged, or is there additional information on location or activity or task or whatever?

Ms. Behling: Ron, can you answer that question?

Mr. Buchanan: It's been awhile since I've looked at this. I did it partly. Harry did the original work on this and then he wasn't available so I worked on it some and we wrote this up. And so I cannot answer that question directly today. We would have to answer that question -- have to look at that to answer that question. However, we did not go back and -- I just pulled up some of the write-up. We did not sort it out by department that I can see. That was the overall data. It wasn't sorted by any sort of

department. I can answer that question. However, the particulars on it I could not present today.

Member Richardson: So the judgment that it's claimant-favorable here means for all workers at the facility, the imputed mean value for all average workers may be higher than average workers. But for an individual who was working in a department or task where they had higher probability of exposure, imputing the facility-specific mean is unlikely to be claimant-favorable would be my -- just the conclusion I might jump to.

If there's nothing else as a basis for imputation other than the mean from a future period projected back to a mean in an earlier period that seems difficult for me to believe that this statement is claimant-favorable. Unless we're speaking on average for the facility.

(Simultaneous speaking)

Mr. Buchanan: Yes, it's on average. It's not divided up by any department because there was not enough data. We were looking for data. According to what I'm looking at here we did not divide it up by department.

Ms. Behling: And if you'd like we can go back and pull this information and pull this evaluation and present that, send that to the Board.

Mr. Katz: Well, hold on, Kathy. Let's hear from Tim, see if Tim can shed any more light on this. Thanks.

Dr. Taulbee: I can't shed a whole lot more light on that. I do agree with what Ron was saying, that we didn't -- they didn't go back to the area type of information. But I would like to point out that this is an SEC during this time period currently. So when we're making a coworker model we're trying to develop a model that we believe to be claimant-favorable to assign to the workers who are not covered under the current SEC. And we're kind of doing the best that we can with the data that we

have.

Mr. Katz: That's an important note. Thanks, Tim.

David, do you have any other thoughts before we go to other questions?

Member Richardson: No.

Mr. Katz: Other Board Members have questions on this or other in the room? How about Board Members on the line?

Okay. So, this is a situation where the data is limited and it's an SEC. So the data are what they are.

I'm just wondering how the Board Members want to handle this. I think that sort of explains why the Subcommittee closed this finding.

So I guess there could be discussion about whether there's a better way to go at this when you simply lack the data to do what Dr. Richardson is suggesting.

Otherwise it seems like --

Member Richardson: I mean, I agree we could just go forward. I'm not comfortable with the language of saying that this imputation -- unless it's going to be clarified that this imputation is claimant-favorable on average or something like that. There's a lot of situations where one would impute a very low mean to a site and yet there could be areas where that's not at all representative.

I guess -- there seems like there is information later. There's no possibility of partitioning the K-25 facility in any way based on a department or other administrative thing to have a lower and higher mean, for example?

Dr. Taulbee: Remember that this would be applied then to an unmonitored worker. And you don't have information of where they would have worked. So

they could have worked in a high area or a low area. And so by looking at it all together we can look at the 50th percentile and the 95th percentile, assign a full distribution to them so in IREP they would be given some credit there.

If there's information that perhaps they worked in one of these other areas of higher exposure we could assign the 95th percentile.

Member Richardson: So there's no employment information regarding department or job.

Dr. Taulbee: I don't believe it's generally available. Well, self-reported, sure. When the person files the claim. But department information if they weren't monitored then we don't always have that information. It might be in the medical file, but I'm not really sure there. Keep in mind we would be assigning the full distribution here to these people.

Member Richardson: I guess it's fine. I'm trying to think back to what was done historically with the K-25 workers. I feel like there's the health physics department, but there's the administrative department. It would be based on employment records I would think.

Mr. Katz: Paul.

Member Ziemer: Could you clarify, maybe Tim could or Ron Buchanan. My understanding is they were monitored, but the site elected not to process all the monitors. They selected what I understood to be representative monitoring devices or badges. I think they were using film badges in those days. To represent -- rather than read them all out. They were not unmonitored in the usual sense. Is that correct? Or am I misunderstanding? That we would take, or that they would take a certain number of the badges and read those out and attribute the others, or represent the others by that group.

Dr. Taulbee: Right. That's my understanding, but when I was referring to the unmonitored that would

mean they were wearing a badge but it was never read so effectively it's unmonitored.

Member Ziemer: So we're calling them unmonitored.

Dr. Taulbee: Right. But I believe you're right with the representativeness and correct me if I'm wrong on that one.

Member Ziemer: There's a sense in which the ones they did read out are representative of the others more so than you might get from a truly unmonitored group that maybe had different jobs than the ones they read out.

Member Richardson: Yes. My sort of vague recollection of this is historically at that period the dosimeter was incorporated into the badge. So at Oak Ridge everybody had a dosimeter because it was incorporated into the badge that was required for entry.

I believe -- I was reading the question about the presumption of which dosimeters were read. It was that not it was representative, it was presumably they were oversampled on people with higher probability of exposure.

Member Ziemer: Which might be more bounding, but not necessarily --

Member Richardson: And so that's the question. But it's apparently not clear what this sub-sample of dosimeters that were monitored was because it's not documented. So we're using our recollection, our intuition to understand what these numerical values are for this period where most of the dosimeters were not evaluated.

Mr. Katz: David.

Member Kotelchuck: Yes, Dave Kotelchuck. I do feel a little uncomfortable using the word "likely" when it is not likely. It is on average. And I would be

comfortable if we were to change "likely" to "and on average claimant-favorable." That is a correct statement and one can disagree with it. Others might disagree with it, but at least we would be speaking what we understand to be the most factual thing. So I'd like to just suggest that.

Mr. Katz: Okay. And keep in mind that the methodology is what it is. So it will produce the results it does. What we're talking about here is simply really the Board's characterization of what we're delivering here. And maybe it also can be reflected in NIOSH documents too, which I think makes sense.

Member Kotelchuck: I just don't want to characterize it beyond what we really feel we can fairly characterize it to be. The process is the process.

Mr. Katz: Absolutely. Absolutely. Thank you. I think these have been excellent questions, discussion.

Are we ready to close on this? Just looking around the room I think we've sorted this out pretty nicely. All right, then.

So the motion again of course is to close the review. And Paul, do we want more discussion?

Member Ziemer: Just for clarity, is there any more that's going to -- any follow-up on Finding 2, or it is what it is?

Mr. Katz: Well, I think the one follow-up could be just reflecting in the NIOSH documentation that perspective on what claimant-favorability degree we have here. That on average, I think. That's what the public, if they do look at the documents, that's what they see in terms of the methods used for their dose reconstruction. But Tim?

Dr. Taulbee: And we can add that language, on average claimant-favorable to OTIB-0026.

Mr. Katz: Yes. I mean, I think that's nice and transparent.

Member Ziemer: But that doesn't really change anything.

Mr. Katz: It doesn't change the number that the person gets, no, it doesn't. But I think it was agreed that there's really not a better way to handle this limitation of data.

All right. So, I'll run down the roll call. Again, the motion is to close the review for external for K-25. Anderson?

Member Anderson: Yes.

Mr. Katz: Beach?

Member Beach: Yes.

Mr. Katz: Clawson?

Member Clawson: Yes.

Mr. Katz: Field?

Member Field: Yes.

Mr. Katz: Kotelchuck?

Member Kotelchuck: Yes.

Mr. Katz: Dr. Lockey is recused from this one. Dr. Richardson?

Member Richardson: Yes.

Mr. Katz: Dr. Roessler?

Member Roessler: Yes.

Mr. Katz: Mr. Schofield?

Member Schofield: Yes.

Mr. Katz: Ms. Valerio?

Member Valerio: Yes.

Mr. Katz: And Dr. Ziemer.

Member Ziemer: Yes.

Mr. Katz: And all who could voted in favor. The motion passes and that review is closed. Thank you very much. That was excellent.

Onto the third presentation. Kathy, the presentation is up on the screen.

Dose Reconstruction Method for CLL

Ms. Behling: Okay. The next presentation is OTIB-0082. Can you hear me?

Mr. Katz: Yes, thanks.

Ms. Behling: Okay. And this one is a little bit different. This is the Dose Reconstruction Method for Chronic Lymphocytic Leukemia, CLL.

On slide 2 we give a description of the CLL model. And the OTIB-0082 describes the CLL model and provides guidance on its application.

Now, this OTIB was initially published on December 4, 2012. There was a page change revision a few days later and this page change was issued to clarify the use of OTIB-0017 which provides guidance on the assignment of shallow dose and to add a description of the blended electron DCF which I will be discussing in greater detail later in this presentation.

SC&A submitted its review of OTIB-0082 in October of 2014. The risk model which was developed by SENES Oak Ridge entitled Review, Synthesis and Application of Information on the Human Lymphocytic System to Radiation Dosimetry for CLL is the basis for OTIB-0082.

That review of that risk model was not included in this review since it had been extensively peer

reviewed prior to its publication in 2012.

SC&A actually had no findings with our review. However, we're presenting this material in hopes of providing a better understanding of the complexity of the CLL model.

Okay, we can move onto slide 2. Estimating radiation dose to cells suspected of giving rise to CLL is very complex and challenging for the following reasons.

CLL originates in B lymphocytes which are distributed throughout the lymph system. And these B lymphocytes can travel through various compartments of the body. Therefore they affect numerous organs of interest.

In addition, their inventories can significantly differ based on factors such as age, gender, health status, et cetera.

So estimating dose to these cancer sites for CLL cases requires calculating dose to this population of CLL precursor cells and this becomes complex because as stated above CLL precursor cells can be present in different compartments of the lymph system. And since the B cell population in a given compartment is not constant the affected organs can receive substantially different doses. So to develop the CLL dosimetric model compartment-specific weights were derived based on the relative size of B lymphocyte pools to estimate the weighted average radiation dose. Due to the variability and uncertainty in these distributions probability distribution functions were assigned to the number of lymphocytes and to the fraction that represent the B cells for each of the organs of interest.

Moving onto slide 4, in the final CLL model an average dose and associated uncertainty was derived for a total of 30 compartments.

For external dose B lymphocyte compartments correspond to 15 organs for which dose must be

assessed.

For internal dose calculations there are a total of 28 organs that are impacted by the B lymphocyte compartments.

And for medical X-ray dose calculations the B lymphocyte compartments correspond to 18 organs.

And the ICRP-modeled organs that correspond to each of these compartments of the CLL model are shown in Table 3-1 of OTIB-0082 and that has been reproduced in slide 5.

And I apologize because it's difficult to read, but I thought it was important to include this particular table.

So in order to calculate external dose as we see on slide 6 we -- to calculate the external dose using dosimeter measurements -- we can move on to slide 6 -- okay, thank you.

To calculate the internal dose using dosimeter measurements for the individual organs listed in Table 3-1 required the derivation of a special dose conversion factor which is used to estimate dose to the appropriate CLL compartments.

For external dose calculations this what we'll call blended CLL DCF is the sum of B cell fractions for each of the 15 organs of interest times the DCF for each organ.

And a complete description of this derivation of these blended CLL DCFs is provided in a separate report. It's the DCAS-RPT-004, Chronic Lymphocytic Leukemia Dose Conversion Factors is the name of that report.

It should also be noted that the blended DCFs are based on DCF values that are cited in the implementation guide, the External Dose Reconstruction Implementation Guide, IG-001 for selected radiation types, energies and exposure

geometries.

And they were calculated using Monte Carlo methods.

And onto slide 7. For each CLL DCF NIOSH employed a total of 5,000 iterations which were fitted to 5 standard probability distributions.

And those distributions included normal, lognormal-3, lognormal-2, Weibull-3, and Weibull-2. And a detailed description of the derivations of these distributions is provided in RPT-004.

A best fit of the data associated with these five distributions was determined using the Akaike information criterion, AIC, and selecting the fit with the lowest AIC score.

To ensure that the proper blended DCF values were applied in dose reconstruction NIOSH created a CLL tab which contains the CLL DCFs. And that was added to all of the site-specific external dose calculation workbooks.

SC&A's review of the external dose methodology for CLL cases included critically reviewing the statistical approach that was used in RPT-004 and also verifying that the site-specific external dose calculation workbook had been updated with the appropriate CLL DCFs as provided in RPT-004.

This resulted in SC&A concurring with the methodologies by NIOSH to derive these blended CLL DCFs.

Now, onto internal dose. Internal dose which requires a calculation of dose to 28 organs or tissues.

NIOSH needed to develop -- NIOSH developed a CLL Simulator Tool. And this tool allows files that are generated by the IMBA software program and the Chronic Annual Dose Workbook, CADW, to be imported and for internal doses to be calculated for

all CLL organs simultaneously.

The CADW was also modified to create separate files for each of the 28 organs and tissues which can subsequently be used in the CLL Simulator Tool.

Onto slide 9. And that lists all of the other -- not all of the other, I'm sure there's more than this, other guidance documents at this point at least, and site-specific tools that needed to be modified to address applicable aspects of the CLL risk model.

Things like OTIB-0054 which is the fission and activation product assignment, and the Super S OTIB-0049, site-specific radionuclide chooser tools and internal environmental tools that are site-specific.

Continuing on with internal dose on slide 10, SC&A evaluated the accuracy of the internal dose methodology for CLL cases.

First, SC&A was given training on running the CLL Simulator Tool. We generated IMBA files and CADW files for a CLL case. We imported those files into the CLL Simulator Tool and we assessed the internal dose generated by the tool. SC&A also reviewed site-specific tools and the dose reconstruction guidance to perform -- for performing the internal dose estimates to ensure that the accuracy of the updates, to ensure the accuracy of the updates for the CLL cases.

SC&A determined that the appropriate changes were incorporated into the applicable tools and the tools generated internal doses that included weighted organs and tissues as specified in OTIB-0082.

SC&A also verified that appropriate changes were made to the applicable technical guidance documents for performing best estimates for CLL cases.

Now, medical X-ray dose. To calculate medical X-

ray -- occupational medical X-ray dose from chest or lumbar spine exams, dose estimates to each CLL compartment were defined by the product of the incident air kerma and the compartment-specific DCF associated with each of the organs. That's shown in the second column of Table 3-1.

For the CLL compartments involving skin, the entrance and exit skin doses defined as well as the fraction of skin exposed with it varying from 0.19 for a properly collimated beam to 0.38 for poorly collimated beam.

The effective dose to the CLL precursor cells from occupational medical exposure is the sum of the weighed organ doses with consideration of uncertainty associated with each organ-specific DCF value and the weighted fraction of the CLL cells.

Moving onto slide 12. To assist the dose reconstruction for CLL medical X-rays NIOSH, developed CLL X-ray doses that were facility-specific, view-specific, PA or lateral, and facility-specific to a given time period. Variables included assigned organ dose and whether the beams were properly or poorly collimated. And then NIOSH updated each of the site-specific external dose calculation workbooks to include a CLL X-ray data tab which contains a lookup table of occupational medical X-ray doses.

Slide 13. SC&A's review included NIOSH's methodology and guidance for assigning occupational medical X-ray dose to CLL compartments.

This review determined that NIOSH properly adjusted existing models to comply with the CLL risk model. And SC&A also reviewed each of the site-specific external dose calculation workbooks and was able to verify that the CLL X-ray data tab was included and that these values were consistent with the TBD guidance.

Lastly, SC&A -- in order to validate the guidance

provided in OTIB-0082, SC&A conducted a preliminary review of a CLL case that was assigned under our audit of the 19th set of dose reconstruction reviews. The case that was reviewed included photon and neutron doses, occupational medical exposures, bioassay data, IMBA inputs and results, and the CLL Simulator Tool.

And this evaluation and spot check of calculations and doses resulted in SC&A concluding that for this case the dose reconstructor followed appropriate procedures and assigned correct doses. And it appeared that the guidance in OTIB-0082 was appropriate for the dose reconstruction process.

That sums up our review of OTIB-0082. And as I said there were no findings, but I just thought it might be beneficial for the Board to get a better understanding of the complexity of this model.

Mr. Katz: Thank you very much, Kathy.

Ms. Behling: Thank you. And if there are any questions I hope they're directed at NIOSH.

Mr. Katz: I'm just giving them a chance to digest. David.

Member Richardson: Thank you. Could we go back to the medical doses because that seemed to me the one that I thought I understood the best.

So for the medical doses the body is viewed as partitioned into compartments. There's an estimate of the dose to each compartment and the estimate for the CLL overall, the CLL quote unquote "organ dose" is the sum of the weighted compartmental doses. Or the weighted doses to target organs where the weight is a weight which is derived based on an estimate of the fraction of all B cells which are within that compartment.

Am I saying that back to you correctly?

Mr. Katz: Tim.

Dr. Taulbee: Yes. Yes, you are. It is derived based upon the probability of where the B cells are in the various organs with the various views associated with the medical X-rays.

Member Richardson: So, I guess a first question is what's the basis for the weights? Is that something that NIOSH has derived? At least here I didn't see a documentation of that.

Dr. Taulbee: If you look in RPT-004 where we developed this for the external doses in there it gives that probability distribution of where those B cells are in the various organs over time, or actually at time. And so that same distribution was used for the medical X-rays.

Member Richardson: But was that something that NIOSH derived, or is there a literature on the distribution of B cells in the body?

Dr. Taulbee: I believe it was a literature search is how we came up with that distribution. I'd have to go back and look closely at RPT-004 to verify that, but --

Member Richardson: Did SC&A review that, that component of this?

Dr. Taulbee: That I don't know.

Member Richardson: Does SC&A know if they reviewed that?

Mr. Katz: Tim, was that part of the original peer review when developing the CLL model?

Dr. Taulbee: I don't remember what SC&A reviewed.

Mr. Katz: No, I'm talking about the original peer review by external experts.

Dr. Taulbee: Yes.

Mr. Katz: Was it part of that?

Dr. Taulbee: Well, wait a minute. No, the external peer review was about whether CLL was radiogenic or not and whether we should be including it. That was the external peer review.

Mr. Katz: Okay, that was limited to that.

Dr. Taulbee: Yes.

Member Richardson: So I think I understand. So there's weights which were -- are based on a model for where B cells are distributed in the body and that's something which we could or could not consider.

I was wondering about like the compartment of the skin, but I'm not a B cell expert.

And then there's an estimate of the dose to each of those organs. And the final dose which is going to be the quote unquote "organ dose" for the CLL is the sum of those weighted doses to those target organs. And again with the weights are the fraction of the B cells that are in that organ.

Dr. Taulbee: That is correct.

Member Richardson: So, now when we move to the external dose model which was the first one we went through maybe SC&A could talk me through because I didn't understand the rationale for the different approach. And this is the slide here. To account for the correlation of dose between dosimeter measurements and individual organs a special dose conversion factor was derived.

I was trying to understand why there was correlation between dosimeter measurements and organs.

Dr. Taulbee: We treated the B cells as a distribution throughout the various components, various organs. And so they're all correlated together because we're taking this population -- some of the B cells can't be greater than 1. So as we're varying that because

there is some uncertainty which is why I'm thinking we didn't use a set number, we used a distribution for each of those organs. So as we're going through and doing the Monte Carlo simulation to come up with the dose conversion factor we're making sure the B cells are all coming up to 1. So there is a correlation with that as we're assigning that dose conversion factor from IG-001. And so as we're summing them up it all has to come up to 1. Are you following my discussion there?

Member Richardson: But I guess going back, there's no Monte Carlo calculation for the medical dose? There it's a single weight which is assigned to each. There's no draw from a distribution?

Dr. Taulbee: I believe there's a draw.

Dr. Lobaugh: So what I was going to say, the main difference -- sorry, this is Megan Lobaugh for people on the phone.

The main difference between medical dose and the external dose would be that medical dose we know the way of exposure based on the PA or LAT of the diagnostic that was actually done. So we know that the radiation was coming from the front, or the back, or the side.

When you have an external dose on a dosimeter we don't know which way they were irradiated. So we have DCFs for all different irradiation schemes, right. So, isotropic, from the front, from the back, from the side. So we have to look at all those DCFs when we do the external dose. If that makes sense.

Member Richardson: You have different geometries and energies of exposure that you want to calculate dose conversion factors for.

Dr. Lobaugh: So the reason we can use the single weight, the known weight, of where the B lymphocytes are distributed within the body for the medical dose is because we know the geometry of irradiation.

Member Richardson: It's not a single weight though I don't think. It's a probability distribution on there as well.

Dr. Lobaugh: Yes. Yes, but the reason why it doesn't need to be combined with the DCF there is because the DCF is based on that irradiation scheme as well. And it's just one number.

Dr. Taulbee: To answer your question earlier about those B cell probability distributions, those were developed by SENES. And so we do have them for each of the organs. So each of those organs have a B cell probability distribution associated with them.

Member Richardson: Okay. I need to think. But I'd like to at some point get to the internal doses as well.

Mr. Katz: Okay. Well, do we have other questions? Paul?

Member Ziemer: Just to follow up on the medical. So on the medical presumably -- typically it's a chest X-ray, but other organs, you'll have to remind me. Are we considering scatter into other organs? So you have some dose delivered to other organs combined with their B cell population to --

Dr. Taulbee: We do.

Member Ziemer: -- get probabilities for all different organs.

Dr. Taulbee: Yes, we do.

Member Ziemer: Yes, thanks.

Mr. Katz: Other questions from Board Members before we go back to David? David.

Member Richardson: So, for the internal doses it wasn't clear to me whether this -- the description here, you're running a calculation. You're deriving simultaneously estimates to 28 target organs, deriving a final value. Is that a weighted sum of the

target organs specific estimates, or is there a selection of a maximal organ? I wasn't clear what was happening there.

Dr. Taulbee: And this is where I'm going to ask if Dave Allen is on the line? You haven't heard anything back? Okay.

I really don't know the answer to that. I believe they're doing the same thing that external did from the probability distributions, but I can't -- I don't know that off the top of my head.

Member Richardson: Yes, the algorithm didn't seem to suggest that. It seemed like you're running the whole simulator, its outputting 28 target organ-specific values after which there would have to be another MCNP layered on top of that which -- I appreciate that's like a nightmare. But I wasn't clear what the decision is at the end once you've got these 28 values.

Dr. Taulbee: And I'm sorry, I don't know that for sure. But we can get back to you on that.

Mr. Katz: Do I have any questions from Board Members on the line?

Member Anderson: That was a question I had. Thank you.

Mr. Katz: Okay. That was Andy, by the way. Henry Anderson.

Member Anderson: It seems like a full scale operation.

Mr. Katz: I'm sorry, Andy can you just speak up a little bit? It's a little hard to hear you.

Member Anderson: Okay. My question was I think was previously answered so I'm good.

Mr. Katz: Okay, thank you. Other Members on the phone? Questions?

Member Clawson: I'm good with it, Ted. I will let you know though, you guys are getting more garbled as we go on during the day. It's a little bit harder to hear you. It's kind of garbled up.

Mr. Katz: And you're a little bit garbled too, Brad.

Member Clawson: I see. No, I just watched it progressively get worse.

Mr. Katz: You always see right through me. Am I clear even speaking to you, Brad?

Member Clawson: Yes. It's --

Mr. Katz: Okay. So just endeavor, everybody, to speak close to your mics. But thank you. Thanks for that. We need to know that as that happens. We tend to drift as a Board, as times goes on, from the mics.

So I guess my question, David, is: is this an issue? Do you want to know more before you sort of adjudicate on closing this review? Because it sounds like we're not ready to completely answer your questions.

Member Richardson: It would be great if those few questions could be answered. How are internal doses being -- how is the final decision being made on that. I think that's a big one.

I think I'm understanding about what was called a blended DCF. I appreciate more what that's about.

Mr. Katz: Okay. So, that's fine, that's fine. My suggestion then to the Board is that we not act on this at this meeting, but just keep it on the agenda. We can have it on the next Board meeting for follow-up.

Member Ziemer: I have a question though.

Mr. Katz: Sure. Paul, go ahead.

Member Ziemer: I want to clarify, I think this

question is probably for Kathy.

My understanding of what SC&A actually reviewed was whether or not the methodology worked in the way that NIOSH said it would work as opposed to the underlying assumptions, the correctness of the distribution of B cells, for example.

Kathy, could you clarify what exactly SC&A did? I think you were just saying that the workbooks and the model worked the way NIOSH said it would work. Am I not understanding that correctly?

Ms. Behling: Yes, you are correct in that. And I think up front I indicated that we were -- when we were tasked with looking at OTIB-0082 we were specifically told that we were not supposed to look at the underlying model, that that was something that was extensively peer reviewed.

It was used to generate the OTIB-0082. So we looked at the RPT-004 which was how the DCFs, the blended DCFs were calculated.

We also looked at the new tools that were generated such as the CLL Simulator Tool.

And we went into the site-specific external dose calculation workbooks and made sure that when they indicated that there was a new tab that was incorporated to assist in the dose reconstruction process that that had been done for all of the sites and that all the information in there was correct.

Member Ziemer: Thank you, Kathy. So my thought on this was that perhaps we could approve that action.

I think the underlying issues, clarity on those would still be helpful, but it may not affect what SC&A did here. If I understand it correctly.

Mr. Katz: Right. I mean, I guess just my one thought about this is. So, to the extent that we're talking about diving into what was peer reviewed, I

mean the original models were put up at the same time we did the rulemaking. We had to have the models before we could do the rulemaking. And the rulemaking and the models came before the Board at that point and the Board approved the rule and in effect approved the models with them. But, nevertheless.

And so yes, so SC&A's review is a review on the mechanical level, absolutely. And where these questions of David's fall is not totally clear to me at least whether they go beyond how things were put into effect, or whether they back up to the model that was approved at the time the rulemaking was done.

But what I was going to say before -- and you can respond, is I do think it's important that the Board is settled and has its opinion on the work anyway, however, wherever that falls, because again, this is the DR process for a whole lot of claimants and it's important that the Board be supportive of the final product.

So then it works either way for me, Paul. We can hold it open, or we can close SC&A's review, but keep this as an item to get follow-up on at the next Board meeting. Whatever the sentiments of the Board are, that's fine.

Member Ziemer: I would certainly yield to David's desire on this. I think either way, whether we act on this now or later we still need some clarity on the underlying assumptions if that is needed.

Member Richardson: Could I ask just for a clarification? Who tasked SC&A with this review?

Mr. Katz: The Board.

Member Richardson: When?

Mr. Katz: This would be the Procedures Subcommittee, but approved by the Board quite a long time ago. I don't know, Kathy, what the date,

original date for the tasking was. I don't know.

Ms. Behling: Somewhere around 2014.

Mr. Katz: Okay.

Member Richardson: So five years ago the Board asked you to evaluate whether you could go through implementation of the written procedure and see whether it worked with clarity and you could come up with the numbers that NIOSH had said.

Ms. Behling: Correct.

Member Richardson: Okay. Thank you. In terms of whether the Board approved all of this before, again, your recollection is probably better than mine because I feel like I must be forgetful of a lot of things.

I don't believe I ever saw this detail of discussion or presentation about what was happening with this dose reconstruction.

I believe even as reflected by the answers to the questions where it's uncertain how it's being implemented, even the people who have been involved in it are not quite clear about what was going on. So I don't think that we sort of at this level of detail discussed this.

Mr. Katz: I can be clear about that. We didn't because SC&A didn't do this mechanical review at that point. I'm talking about at the point where the Board cleared the model and the rulemaking which would have preceded that. So of course it wasn't done. There wasn't an SC&A review as part of that. It was not a component of that.

Member Richardson: But the model must have been expressed in some higher level of abstraction than this.

Mr. Katz: I don't recall how the release exactly worked.

Dr. Taulbee: I don't recall all of it from that. I was involved in the external part of that and we did release Report 4 which does do the details for how the external DCFs were developed.

It's 300 pages long, that particular report is.

So in the rollout of that I'd have to go back to the transcripts and look and see were there separate presentations on each of those.

Mr. Katz: I mean, I'm sure there wasn't -- I recall the presentations on the model were more abstract than this discussion. So, yes. There were presentations to the Board on the model, how this was going to be handled. That's for certain and the Board gave a thumbs up on that. And that's what I'm saying. But I have no problem whatsoever with digging into details at this point. That's fine.

Member Richardson: Thank you. And thank you for reassuring me that my memory is not horrible. I know it's not good.

Mr. Katz: I have the worst memory of everyone. So no, I would never.

Okay. So then let's -- so David, are you fine with putting this SC&A review to bed and keeping this on the agenda for the Board to address your questions? It sounds like yes. Okay. All right.

So then, again. So the motion is to close this SC&A review and Subcommittee Procedures review. And I'll run down the list. Anderson?

Member Anderson: Yes.

Mr. Katz: Beach?

Member Beach: Yes.

Mr. Katz: Clawson?

Member Clawson: Yes.

Mr. Katz: Field?

Member Field: Yes.

Mr. Katz: Kotelchuck?

Member Kotelchuck: Yes.

Mr. Katz: Lockey?

Member Lockey: Yes.

Mr. Katz: Richardson?

Member Richardson: Yes.

Mr. Katz: Roessler?

Member Roessler: Yes.

Mr. Katz: Schofield?

Member Schofield: Yes.

Mr. Katz: Valerio?

Member Valerio: Yes.

Mr. Katz: And Ziemer?

Member Ziemer: Yes.

Board Work Session

Mr. Katz: And all in favor. It's done, it's closed. Thank you very much. And thanks for this discussion as well.

Okay. We are at -- subtract three hours. 10:25. Let's see where we're supposed to be. We have a break at 10:45. We do have 20 minutes.

If you want to get some Board work session out of the way, we could talk about a few things before we break. If that's okay? Are you good with hanging in a little bit more?

Okay. So, for now we are -- Board work session. We

usually try to knock out the scheduling. Let's get that at least out of the way.

So, the next meetings to schedule, we have a location issue for April and then we have the year out scheduling for Board meetings for both the teleconference and the face to face.

And for locations, so here is what I would suggest as possibilities we have here coming up. And of course I'm open to all of your input, other ideas.

But Hanford we have several documents that will be out in this time frame before that Board meeting, which is mid-April. I don't have the date right at hand but I could tell you in a second.

We have several that are related to the SEC that are coming out. So that would be an opportunity to get input from Hanford community on those sort of newly released documents related to the SEC. And Hanford is a pretty manageable location. I think for late April it should be okay.

And the other location that I think might make sense for either April or summer which is August is INL. We have a burial grounds paper that should be released fairly soon, the burial grounds follow-up which is relevant. And I believe there will be work done related to the INL reactors also, right? Is that correct, Tim? Yes. So there's a reactors-related report. You all recall that's a complicated business. But that should be coming out before then too. So INL again, we'd have fresh documents that are relevant to the community there. Tim?

Dr. Taulbee: That reactor report is probably more into late spring. So that would be like coming out just before that Board meeting. So it might make more sense to push Idaho.

Mr. Katz: Oh, right. I'm sorry. So I meant to clarify that. Yes, so that's really -- exactly. I was thinking -- I was thinking exactly along those lines, that Hanford might make sense for April and INL for the

summer. It's been our tradition to go visit Brad in the summer. But let's hear from other Board Members about this or other thoughts.

Member Beach: So Ted, we also have Metals and Controls Work Group scheduled for January that might be ready at that time also. Unless you think that's going to happen ahead of that.

Mr. Katz: We do. That what would happen?

Member Beach: At like a Board call.

Mr. Katz: Oh no, we're not going to do an SEC at a Board call.

Member Beach: Okay. So that might be --

Mr. Katz: So we do have that, but then that would be an action and then it doesn't make as much sense to go to Massachusetts for the Board to make its decision as it does to when we're rolling out new documents and want input on those, I think.

Member Beach: Okay.

Mr. Katz: Massachusetts. Very iffy weather in April. No, that's -- anyway, but that's one suggestion. Others? Board Members? On the line? What would you like? Does that make sense, Hanford?

Member Anderson: How long of a meeting are you expecting?

Mr. Katz: Andy? Sorry?

Member Anderson: How many days?

Mr. Katz: Well, this one might be pretty busy because we have a number of sites with petitions that could be ready.

We have SRS which we are working towards that. That's our hope. And that's a lot of material too. So that's a busy session.

We potentially have the Santa Susana sites. There

are two of those. And those might be ready.

And we also have Metals and Controls, as Josie just said. There's a chance that could be ready also for April.

So that's three SECs that I can think of off the top of the head.

Member Anderson: I'm just --

Mr. Katz: Sorry?

Member Anderson: My only point -- we can get to Hanford. And it is a little longer trip back and forth for those in the Midwest and East. So if it's a multiple day meeting it makes it more practical to do two days of travel for --

Mr. Katz: For two days of meeting.

Member Anderson: Two days of meetings would be good.

Mr. Katz: Right, right. So anyway, I mean it's always hard for us to -- fortune-telling about the next Board meeting in terms of the agenda. But it looks like it could be a busy one, in which case --

Member Anderson: Then are we going to have a party for you?

Mr. Katz: Sorry?

Member Anderson: Are we going to have a day of party for you in April?

Mr. Katz: No, no parties.

Member Anderson: That will be the last face to face. Is that going to be it for you?

Mr. Katz: Oh, sorry. So, yes. April will be it for me, so to speak. Yes. That sounds a little bit fatal.

Member Richardson: I was thinking Santa Fe.

Mr. Katz: Oh, so I mean that's another suggestion. We do have -- Tim, I guess, or Bomber? Let's just talk about the New Mexico situation since that's another possibility, absolutely.

Mr. Rutherford: Are you talking about Los Alamos or Sandia?

Mr. Katz: We are. We're just talking about April, in the twenties I think, is the meeting.

Mr. Rutherford: April, we're definitely not going to be ready with Los Alamos. We've got a lot of documents to be released and we haven't got our sampling plan together yet.

Sandia, we have a tour scheduled in early part. SC&A's reviewing Sandia so I really don't think that we'll be ready in April for that unless SC&A gets their report out early and then -- and there's not much to that report that we have to respond to.

Mr. Katz: Joe, it's all on you. Concise. Okay. So that sounds iffy. That sounds like it's more likely, then, a prospect for the summer when it's nice and warm in Santa Fe.

Other thoughts? Okay. I think that's probably all the prospects there could be.

So, some -- are we going to Hanford?

Member Beach: We can go to Hanford. That's perfect, I don't have to travel.

Mr. Katz: Are we all right with that?

Member Beach: It's April 22 right now.

Mr. Katz: Sorry, Brad, I can't hear you. Go ahead.

Member Clawson: Do we have anything from NIOSH yet on Hanford?

Mr. Katz: No, but they're rolling out fairly soon. That's what's happening.

Member Clawson: I've been waiting for a while for that opening. Thank you.

Mr. Katz: I know you have. Ultimate patience, Brad, I know, you do. Let me find the dates. Twenty-second and twenty-third. Okay, that sounds right.

I mean, everyone else has these dates. If someone else has it on their calendar.

Member Clawson: I blocked a whole week.

Mr. Katz: Sorry? That's right. That's fine.

Member Anderson: We need a travel day which would either be Monday or Tuesday.

Mr. Katz: Yes. So it's the 22nd and 23rd, Andy. Okay. All right. Well, I'm not hearing a great movement anywhere else other than Hanford so let's say that's where we'll go.

All right. And it's -- we can just take our break now I think and rejoin at 11 o'clock. And we'll be dealing with the Secretary's report on dose reconstruction case reviews. Thanks, everyone.

(Whereupon, the above-entitled matter went off the record at 10:35 a.m. and resumed at 11:04 a.m.)

Draft Report to Secretary, HHS on Dose Reconstruction Reviews

Mr. Katz: All right, so I think we can get started. I'm sure Andy will join us shortly. And we have a session on dose reconstruction case reviews report for the Secretary which has been long in the making, but I think it's gone along well. David.

Member Kotelchuck: Thank you. This as you see, this report as you remember is dedicated to the memory of Jim Melius who was a Member of this Board from 2001 to 2018, was Chair from 2009 to 2018.

And I'm going to take a moment to just read the

dedication.

For us on the Advisory Board on Radiation and Worker Health, Jim Melius was a consummate bridge-builder between all three perspectives represented on this Board: scientific, medical and worker. In this pursuit he was patient, humorous, attentive, and insightful in doing his part to bring us as closely into consensus as possible for a given decision. Throughout our activities he was caring of his fellow Board Members, of the program and the Board staff, as well as the claimants, their families and advocates.

Dr. Ziemer said that on behalf of the Advisory Board and I'm just repeating it now.

The report that we are submitting has been -- this is the third report to the Secretary. We the DRRSC has reviewed this and is submitting it to you.

Since our 2016 report -- I'm going to go over some of the conclusions. Since our 2016 report we have examined 166 more cases for a total of 498 cases reviewed since the inception of this program.

During this period up through the Sets 21 which were completed for this report there were 48,089 cases which had dose reconstruction. Therefore we have kept up with our goal of reviewing 1 percent of all cases as you see: 498 over 48,089. It is a 1.04 percent rate of dose reconstruction cases reviewed.

In addition, in this report, we have 18 more blinds for a total of 32 blinds again since the program was developed. In 31 of the 32 cases, 97 percent, both the NIOSH and OSHA conclusions with respect to compensation were the same.

This is particularly notable since 87 percent of the cases selected for the blinds were best estimate cases with a Probability of Causation between 45 and 52 percent, a range of PoCs whose compensation decisions are especially sensitive to any difference in this complex process.

So, and these results give us confidence in the instruction and the procedures given to the dose reconstructors and their results are therefore -- we have confidence that the results are reliable and consistent among the dose reconstructors who have evaluated them.

By the way, for the single case of the difference in compensation, case number 3 in the table, there had been no working group that looked over it. So the case was referred to the Surrogate Data Working Group for consideration. The Working Group concluded that the NIOSH approach in which the claimant's compensation decision was made was an appropriate one and they, if you will, passed that that was an appropriate procedure.

In format as you will note this report is quite similar to that of the 2016, the last report to the Secretary, the 2016 report. But let me mention that there are a number of changes in the text seeking greater precision in discussing and describing the dose reconstruction process and results.

For example, in the 2016 report we describe three basic types of dose reconstructions. In this text, the one that we're submitting, and I should add with the help and suggestions from Ted Katz and the OGC, Jenny Lin Naylor, the text describes correctly one single process, the so-called best estimate process for getting the -- for determining the dose reconstruction. And the other two processes, the overestimates and underestimates, are in fact efficiency measures and they're called that here because -- to help -- they are there to assist the dose reconstructors in completing their tasks to deal with so many claims through this process.

Before closing my remarks I do want to note that reviewing this there was a typo that I found in the data on page 16, Figure 3, page 16. And maybe I'll go there for you to look at.

Figure 3, page 16. And I made a comment in the text that for the cases above 45 percent, that is the

best estimate cases on this graph are between 45 and 50 percent, and between 50 and 52 percent. That's how we've been selecting best estimate cases for our review recently.

So, that's the error is 25 percent and the PoC greater than 50 is 14. That sums to 39 percent. And I apparently, it escaped -- I noticed that we said on page 17 line 1 both PoC segments at or above 45 percent have declined since last report from 51 to 39 percent, not 49 percent. And we'll make that correction.

Everything else that I said here is correct. That was just a typographical error, and I went back and checked the earlier report and confirmed that everything that was said about the report was correct except for that number which should be 39 percent.

With that I'd just like to open it up for comments, suggestions, questions.

Mr. Katz: So, about half the Board, a little more than half the Board is actually on the Dose Reconstruction Reviews Subcommittee.

So those members, if you want to add anything.

Member Kotelchuck: Yes, and I thank you very much for reminding me to mention the folks who are on the Board. And I'm the Chair. Josie is on it, Josie Beach, Loretta Valerio, Dave Richardson and Jim Lockey. Have I left someone out? I didn't do my counting, but I think --

(Simultaneous speaking.)

Member Kotelchuck: Okay. That was -- that's not Henry.

Mr. Katz: That's Brad Clawson.

Member Kotelchuck: Brad. Excuse me, Brad. Oh, yes, sir. Brad, you're -- I went around and looked in the group here. Of course, Brad. So all of you. And

this has been a very active group. And you know, we had a large backlog to deal with in the past for the previous report. And I think we're moving along, we're moving along at a reasonable pace keeping up with -- having our reviews keep up with the pace of claims, at least 1 percent of the pace of claims that are coming in to the program. Thanks, Ted.

Comments and suggestions? Are there any?

Mr. Katz: None in the room. How about on the phone?

Member Ziemer: If you're asking for comments I'd just like to say that I think the report -- thanks for the report. I appreciate the work the Subcommittee did.

In particular, we're charged with a couple of things for the Secretary. One is to confirm that we believe the process is scientifically sound and you've done that in the cover letter.

And also I think the recommendations are important, particularly the third one that you've developed here. I appreciate the work you did on that.

Member Kotelchuck: Very good. Thank you and thank all on behalf of the Subcommittee.

Mr. Katz: Okay. So I don't hear any suggestions, comments, concerns, questions from the Board Members on the phone.

Member Ziemer: Do you need a motion to approve?

Mr. Katz: We do.

Member Ziemer: I'd like to move that we approve the report to the Secretary with the change noted on the number.

Member Kotelchuck: Yes, yes.

Mr. Katz: Second?

Member Beach: I'll second it.

Member Valerio: I'll second.

Mr. Katz: Okay. No more discussion. Let's run the vote and then we'll get to cover letter and so on issues. Anderson?

Member Anderson: Yes.

Mr. Katz: Beach?

Member Beach: Yes.

Mr. Katz: Clawson?

Member Clawson: Yes.

Mr. Katz: Field?

Member Field: Yes.

Mr. Katz: Kotelchuck?

Member Kotelchuck: Yes.

Mr. Katz: Lockey?

Member Lockey: Yes.

Mr. Katz: Richardson?

Member Richardson: Yes.

Mr. Katz: Roessler?

Member Roessler: Yes.

Mr. Katz: Schofield?

(No response.)

Mr. Katz: Phil?

(No response.)

Mr. Katz: Okay, Phil's playing hooky. Loretta Valerio?

Member Valerio: Yes.

Mr. Katz: And Ziemer.

Member Ziemer: Yes.

Mr. Katz: Okay. Phil, do you need to mash your mute button maybe? Okay, well I can catch -- I think I can catch his vote during a work session or whenever he pops back up.

It's in any event unanimous with all the Members who could vote. There's one outstanding vote. The measure passes. So the report is approved.

I drafted a cover letter to accompany and transmit the report to the Secretary. And I'll wait till Dave gets back to the phone. I think I should read it into the record. The cover letter includes a very brief summary that reflects the report summary. And then I think Dave has some edits, suggestions to edit that, which we can capture too. And anyone else. And you should all have copies of this with your materials.

So...

Dear Mr. Secretary. Enclosed for your information is a report prepared for you by the Advisory Board on Radiation Worker Health.

The Board conducts independent reviews of selected radiation dose reconstructions completed by the National Institute for Occupational Safety and Health in accordance with the requirements of the EEOICPA.

The purpose of the Board's review process as mandated by EEOICPA is to advise you on the scientific validity and quality of radiation dose estimation and reconstruction efforts being performed for the purposes of the compensation program.

This report was prepared by the Board's Subcommittee for Dose Reconstruction Reviews with

input from the full Board. It was approved by the full Board on December 11, 2019.

The report covers the Board's review of 166 individual dose reconstructions conducted since the Board's last report to the Secretary in 2016. The three reviews represent over 1 percent of the total number of radiation dose reconstructions performed by NIOSH since the start of the program in 2002.These reviews are generally representative of the overall worker population and work locations covered by the EEOICPA program.

The reviews were prioritized to focus on radiation dose reconstructions that involve more comprehensive dose reconstruction procedures, and on those dose reconstructions for which errors in the dose reconstruction could have a greater impact on claimant compensation decisions.

The Board's review of the 166 dose reconstructions identified 243 findings, approximately half the rate of findings since the 2016 report representing a marked improvement which has now been a continuing trend over these three reviews.

The current report also summarizes 32 blind case reviews in which the Board oversaw independently conducted dose reconstructions which it compared to the final dose reconstructions conducted by NIOSH.

The comparison allows the Board to ascertain whether independently performed dose reconstructions would produce similar results for claimants and to further examine the scientific quality and validity of the methods being applied. The findings from these comparisons further validate that NIOSH dose reconstructions are being performed consistently and with appropriate quality and validity.

Our review of these 166 dose reconstructions as well as the 32 blind case reviews and our ongoing review of the NIOSH procedures used for dose

reconstruction provide the Board with a high level of confidence that the radiation dose reconstruction process is scientifically sound.

Finally, the Board has made several recommendations to modify and improve its review process.

We hope that you will find this information useful and informative. And Dr. Kotelchuck would sign for the Board.

Member Kotelchuck: If I may just first in the attribution just to get the Subcommittee's name it's the Subcommittee on Dose Reconstruction Reviews, of course.

And also in the second paragraph, the Board's review of 166, I would like to just cite the -- since the Board's previous reports to the Secretary in 2009 and 2016.

These combined cases reviewed in all three reports consist of over 1 percent of the total number of -- in other words just cite the two reports. And I have it written up rather than just citing the previous report.

If I may read again since I was having -- the combined cases reviewed in all three reports constitute over 1 percent of the total number of radiation. I might suggest that. I will of course -- if others think.

Mr. Katz: So are you elaborating on what I just said, the three reviews represent?

Member Kotelchuck: Yes. Citing the 2009 and '16 in the previous sentence and then say the three reviews. You know what? You do -- why don't we just drop that because you do mention three reviews. And the previous reports to the Secretary in 2009 and 2016 establishes the first two. This is the second. So let's -- you're right. What the sentence, the three reviews represent are perfectly

-- it's perfectly adequate as it is.

Mr. Katz: Okay.

Member Kotelchuck: So I would just say in the previous sentence let's just add reports to the Secretary in 2009 and '16.

Mr. Katz: Okay. If you just send me an email with that, that would be great. Yes. It's good to try to keep things as simple as possible for these kind of letters to the Secretary because they're read by very high-level people.

Member Kotelchuck: All right.

Mr. Katz: But thank you for that. Any other comments about the cover letter? Okay. So thanks, everybody, and thanks to SC&A for a really terrific effort they put into this, Rose Gogliotti in particular, but others with her into getting this report in shape with the Subcommittee. We really appreciate that.

Member Kotelchuck: Thank you.

Board Work Session

Mr. Katz: We have time. It's -- we didn't use up much of our time here. So why don't we do a little bit more Board work session before we break for lunch?

So we had gotten through scheduling a place and we acquitted that which is good. So let's just sort out dates for the next teleconference that hasn't been scheduled as well as the next face-to-face meeting.

So I have as approximately the right timing an October 26 of next year teleconference date. That week. And that week means, so it's probably -- the 28th is probably the Wednesday if we stick to tradition when we can. But of October of next year.

Member Richardson: You said the 28th of October?

Mr. Katz: So that would be I think a Wednesday, right? Anyone have any problems with that date? Same on the phone, no problems?

Member Anderson: No.

Mr. Katz: Okay, that was easy. October 28 it is. Teleconference. It will be 11 a.m. as usual.

Okay, then a meeting. Grady suggested -- I had on here in my notes the week of December 14, but there's a longer -- Thanksgiving isn't jammed up against December as it is this year so we could back up a week, the week of December 7 if you want to look at that week and see how that would be for your schedules.

So again, Tuesday and Wednesday, or Wednesday and Thursday. Tuesday and Wednesday in this case would be a little better for staff if we can accommodate that.

Member Lockey: The eighth and ninth?

Mr. Katz: That sounds right. How is that for everyone's schedules? Eighth and ninth of December. How about on the phone? I'm sorry, I can't hear you. Say it again?

Member Anderson: Eight and nine of December, you're saying?

Mr. Katz: Correct. Correct.

Member Anderson: Okay.

Member Roessler: Okay.

Mr. Katz: Okay, sounds like it's good with Gen. Phil, that's okay with you? Brad?

Member Clawson: I'll -- that one's good with me.

Mr. Katz: Brad, I couldn't understand you.

Member Clawson: I'm having trouble with you guys on there, too. I said it was good for me.

Mr. Katz: Great, okay. Yeah, you still sound like you're in a fish tank. Phil, are you there?

Member Schofield: I have no conflict there either.

Mr. Katz: Okay, great. Okay, so then there it is. December 8 through 9. That's Tuesday, Wednesday. Well, that was too easy too.

Member Anderson: Do we have a location?

Mr. Katz: We're good to get a location for the next meeting. I could suggest any number of locations. I won't be here.

Member Anderson: The reason is my birthday is on the 10th.

Mr. Katz: Oh, right, of course, of course. It should be near your house.

Member Anderson: That's why I had travel trouble this time. So if I can get home on the night of the ninth I will have a home, and if I don't I'm in trouble.

Mr. Katz: Right, right. It's a day meeting. It will be easy because your travel day would be the eighth or the ninth.

Member Anderson: Right.

Mr. Katz: Okay. All right. So, what we have left for the Board work session -- if you'd like to get started we could get started on some of those; why don't we at least run for 15 minutes, say, with those and then we can pick up the rest of them after lunch -- is the Work Group reports. We do also have public comments. Why don't I do that after lunch. The font is very small. It will be a struggle for me.

So let's do Work Groups. And I will just skip Work Groups, where I'm quite sure there is nothing to say. But you do have the Board coordination report which gives you updates on when you're being delivered reports either from SC&A or the DCAS

group, NIOSH. So you may have -- want to address any of that as well as we go through.

Brad, do you have anything on Argonne East?

Member Clawson: No, it's just -- the report it is just shortly -- and I believe that we're reviewing that as we speak so that's about all I have.

Mr. Katz: Okay. I knew there was a report out. Thanks, Brad. So, it looks like then a little ways down the road we might even have an Argonne East Work Group meeting.

Blockson Chemical, there's nothing there. Brookhaven, there's nothing there. Carborundum, there's nothing there. The Carborundum Work Group is essentially finished.

Dose Reconstruction Review Methods. There's nothing there.

Then we get to Hanford. Hanford. And I mentioned already that there will be some reports coming out from NIOSH relevant to the SEC in the next few months. But Brad, do you have any -- Brad's the chair for Hanford. Any other comments about Hanford?

Member Clawson: No, not at this time. But I have not heard an official date. Does NIOSH have anything?

Mr. Rutherford: Actually our report, it's a White Paper. It addresses the remaining issues.

It is in final review now. It should be out sometime this month, within the next week or two.

Member Clawson: Okay. Thank you, Grady.

Mr. Katz: Yes, thanks. No, that was Bomber.

Member Clawson: You know, you need to forgive me.

Mr. Katz: I know. You're paying the price, Brad, for not being here with us. Okay.

INL. Phil. We may still have lost Phil, but I did note for you all we do have some work coming out on the burial grounds and some work related to the reactors. So there will be some action on INL over these months ahead.

Lawrence Berkeley. We're going to have an update from Paul later today about the work and also about their tour which I hear was great.

And much thanks to the site for that, for hosting them so well. It's really appreciated.

LANL, Josie.

Member Beach: So, we did hear a little bit from Greg. We are waiting on documents from LANL to complete the exotics report and the sampling plan.

I know it was due in I believe September. It was pushed off till now just about, February or December. So I guess LaVon's kind of got the ball on that one.

Mr. Rutherford: Yes, we actually identified -- we ended up doing an additional data capture and we identified roughly 70,000 pages of RWPs, associated with RWPs for LANL.

And the site's reviewing those now. And as Greg had mentioned we have prioritized those over the exotics because the way it works out we can complete the exotics report up to the point of analyzing some of that data. But we need that RWP data first. And so that's pretty much the status on that.

Mr. Katz: Great. Thanks. Metals and Controls, Josie.

Member Beach: I can report the next meeting is scheduled for January 9. We're going to go over a White Paper, the thorium and welding exposure models as well as petitioner's concerns.

I think SC&A is working on that paper now. But anyway, our meeting will be January 9.

Mr. Katz: Right. That paper should be out quite soon, within weeks I think, a week or two.

Member Anderson: That's going to be a phone call, right?

Mr. Katz: I'm sorry, Andy?

Member Beach: Yes, phone call.

Mr. Katz: Yes, it's a teleconference.

Member Anderson: Okay.

Mr. Katz: Yes. Okay. Mound. Mound.

Member Beach: We're just still waiting on that external TBD report. And I didn't see when the date was scheduled for now. It's been pushed back a couple of -- oh wait, no, it's in review I believe. Isn't it? It is. So we should see that shortly. I forgot that part.

Mr. Katz: That's great. Nevada Test Site is Brad. Brad, I didn't look at the coordination report on that one. Do we have something coming from somewhere?

Member Clawson: I'm sorry, I couldn't hear what you were saying, Ted.

Mr. Katz: Nevada Test Site.

Member Clawson: No --

(Simultaneous speaking.)

Member Clawson: You're not coming through. Hello?

Mr. Katz: Brad?

Member Clawson: Not at this time.

Mr. Katz: Do you have something?

Mr. Rutherford: Yes, I was going to mention that we are working on a response to SC&A for health physics review actually and it's due in January.

Mr. Katz: Okay. So I thought there was something that should be coming. Right, great. And it's been a while so it will be great to be able to put Nevada Test Site to bed.

ORNL. That's Gen.

Member Roessler: I have heard nothing. Maybe somebody there can bring us up to date.

Mr. Rutherford: Sure, yes. We've done a number of actually captures and stuff. We do anticipate that we will complete this effort in May of next year.

Mr. Katz: Okay. May of next year, Gen. Okay.

Next we have -- I'm not sure if Phil has rejoined us. Phil, are you on the line? Okay.

Member Schofield: I'm sorry, I had it on mute.

Mr. Katz: Okay, Phil. Well, the first thing I'm going to do is get your vote for the dose reconstruction report. Everyone voted in favor, it passed. Are you in support or opposed? Phil, could you understand me?

Member Schofield: You're --

Mr. Katz: The dose reconstruction report. The Secretary's report. You missed the vote on that. From the Dose Reconstruction Review Subcommittee.

Member Schofield: Yes.

Member Clawson: Phil, we voted on it.

Mr. Katz: So Phil, do you have a vote?

Member Schofield: Yes. Voting for it.

Mr. Katz: Okay, thank you. Thank you. That takes

care of that. All right.

So then we're on Portsmouth, Paducah, K-25 Work Group. Do you have any update?

Member Schofield: I don't think we have. We just had all that information from K-25. That was in -- we were just looking at this last week and there was a paper presented this morning on it. I don't think we're ready for a vote on that yet.

Mr. Rutherford: Actually, we are providing responses to the Work Group sometime this month.

Mr. Katz: This month.

Mr. Rutherford: Yes.

Mr. Katz: So, do you hear that, Phil? So we'll get the DCAS responses this month. Thank you. Thank you, LaVon. Okay, Rocky Flats. Dr. Kotelchuck.

Member Kotelchuck: Nothing new.

Mr. Katz: Right.

Mr. Rutherford: I will provide a little update. We actually had completed -- we had identified four interviews of individuals that may have information on neptunium work post 1983.

We have completed those -- we completed three out of the four interviews. The fourth one we could not come up with a place where the individual, where we could do it in a setting, a classified setting.

But we have three individuals that have completed the interview. We will provide those interviews once they have been reviewed by the interviewees. We will provide that to the Work Group for their review.

Mr. Katz: And cleared by DOE, right?

Mr. Rutherford: Yes.

Mr. Katz: Yes. So just roughly what time frame is that?

Mr. Rutherford: You know, we should have our part done and back to the interviewees within the next few weeks. It's just how quickly they get them back to us.

Mr. Katz: Sure. Okay. And then DOE.

Mr. Rutherford: Yes.

Mr. Katz: Okay. All right. So maybe, yes, within the next month or two we might have that. That's great.

Sandia. Andy.

Member Anderson: I don't think we have anything. We have a site visit.

Mr. Katz: Andy, we can't really make you out.

Member Anderson: I can't hear you. It's garbled.

Mr. Katz: Seems like we're having audio problems both ways. So again, where are you with this?

Member Anderson: I can't -- you probably know better. Why don't you say this? You aren't going to be able to understand me here. I can't understand you.

Mr. Katz: Okay. Well, we'll work on this because you need to be able to hear us. Improve the audio quality on their end. Before it was easy for them to hear.

But Bomber, do you want to just give an update for Andy for this?

Mr. Rutherford: Yes. Right now the addendum that we completed is in review with SC&A.

However, there is a tour scheduled in January that will be a tour set up with the security guards and forces there. That is I think January 15, if I remember correctly.

Mr. Katz: Yes. Early January. Right.

Member Anderson: That's right.

Mr. Katz: Right. And several Board Members will be there. I'll be there, SC&A and NIOSH. Okay. Santa Susana. Phil. Phil, you've heard.

Member Schofield: Yes. NIOSH is working on the information that has been submitted. I haven't seen anything from them yet.

I don't know if they have a date for when that's going to be ready. It's supposed to be before the April Board meeting, but I'd like to have a Work Group meeting before that.

Mr. Rutherford: We're scheduled -- we're going to try to push to have it done in time before the Board meeting and to allow for a Work Group meeting.

However, it's -- right now it's scheduled the first of April. First of April.

Mr. Katz: Well, this is actually just to sort this out. This is not for a Work Group meeting, this is on the Board's plate still. So it would be for the Board meeting that it has to be done.

And we also have an SC&A report that's just recently completed that's available that addresses the documents that were submitted.

But they'll be addressing -- yes, the documents that were submitted at the August Board meeting by the petitioner. And immediately following that.

And I will note that the petitioner also has a FOIA in to DOE still that hasn't been fulfilled. And she's awaiting those documents.

Okay, that's fine. So we'll hear more about those then from the petitioner.

Okay. Savannah River Site, Brad. All right. We don't need to go into it now. We have two hours of this this afternoon.

Member Clawson: We're going to have a lightning session on that so I figured I'll just pass it off to NIOSH and Joe in a little while.

Mr. Katz: Yes, unless you want to summarize it all right now. Okay.

Member Clawson: I can do it.

Mr. Katz: Science issues, David.

Member Richardson: I have an outstanding action item for myself which was to move forward with a list of things to do. And I humbly apologize for not having made action on my action item.

Mr. Katz: Okay. Thanks. SEC issues. They are entangled with the SRS Work Group on this same work. So they're in effect covered this afternoon.

And then we have Subcommittee on Dose Reconstruction. Is there anything more you want to talk about there?

Member Kotelchuck: Well, we still, we don't have -- this is one of those rare times that we don't have a meeting set up right now.

I think we're awaiting some determination maybe from you.

Mr. Katz: We're waiting for work to get done.

Member Kotelchuck: Pardon?

Mr. Katz: Yes. We're waiting for work to get done. Some work to get done. So we're sort of between horses right now. We do have a full new set of dose reconstruction case reviews that were completed by SC&A in draft and are -- all of you know better than I, the two-member Board teams are working through those so we can get those finalized.

We also have an assignment of a new set of blinds which is in the works at NIOSH. I think it's on NIOSH's plate to come up with the cases. And they

haven't come in yet.

They should be coming in any day because it's been a little while for that. Josie?

Member Beach: Yes, I just had a question and perhaps a comment on the way the blind reviews are being set up.

Typically in the past, two of us have reviewed a series of five or six. This time around we are split up into different pairs and it seems the scheduling is a lot more difficult.

I was curious as to why that changed.

Mr. Katz: Yes, I did that. So I take credit for that.

It's not the blinds you're reviewing though, it's the full set actually. It's the full set. And I did that because I wanted Board Members to have the experience of working with different team members on some of these different cases. We always have this issue anyway in part because of conflicts. The same team can't work on them all because one or the other might be conflicted with one site or another. So that's always been a piece of the issue.

I just made it a more difficult scheduling process, but I did think at this point given what's going on with me leaving soon and so on, I did want to get Board Members on different teams for different -- and the other issue that had gone on previously is that you would have these tremendously long sessions to get through all your cases together as a team. And Board Members were sorry for the experience and this is breaking it up so that you can take it in small bites instead of --

Member Beach: It might be nice to have a review of how it went and what people's thoughts are, only because on the scheduling end of it I know, I think Rose and Kathy are doing a lot of that. Just to determine if we should move forward in that direction.

Mr. Katz: Yes. I'm really interested in the Board Members. I mean, SC&A, all due respect is paid to do whatever, go through whatever misery we put them through. No offense intended, but it's just, it's more important to me that the Board Members have a good -- the kind of experience that's valuable to them. So yes, absolutely, I think it's a good idea to review and see whether you liked or disliked having different dance partners for the reviews.

Member Beach: One more thing. It just ties up several days instead of one day. So for me it would be nice to review it. Thanks.

Mr. Katz: Okay. I know where Josie comes out on this.

Member Beach: I'm done.

Mr. Katz: Okay. So then moving on to Procedure Reviews. Josie.

Member Beach: I don't have anything in addition. There is not a date scheduled for Procedures Review. If there's anything from NIOSH on what work is coming out maybe. Other than to thank Kathy for the review on the last three reports this morning.

Mr. Katz: Right. We don't have much of a plate of work is the reality.

Member Beach: Okay. Maybe just keep working on getting some of these reviews caught up before the Board potentially.

Mr. Katz: TBD-6000. Paul.

Member Ziemer: Currently we have Superior Steel. We reviewed this I think in June of this past year. Are we scheduled now, Ted?

Mr. Katz: We're in the middle of it. We're almost scheduled.

Member Ziemer: Yes. We've solicited the dates. Ted

determined when the Chair was available and determining when we can meet. I believe it's going to be in January.

Mr. Katz: January or early February.

Member Ziemer: End of January, early February. So we have that to do.

And while we're talking about TBD-6000, we actually have a little carryover. We have Joslyn still to close on and that will have to be done later. It's been sitting for a while.

But the next thing on the docket will be Superior Steel and hopefully be ready to clear that out in about a month.

Mr. Katz: Right. And that's a priority because that's an SEC.

Member Ziemer: Yes.

Mr. Katz: Thank you. Okay, Andy, the Uranium Refining AWEs Work Group.

Member Anderson: Yes. We have a meeting coming up January 30 to go over NIOSH's response to SC&A's review on a Site Profile review.

Mr. Katz: And that's the Site Profile for?

Member Anderson: WR Grace.

Mr. Katz: WR Grace. Thanks.

Member Anderson: And while I've got you, if you can understand me, what was the teleconference date in October?

Mr. Katz: The October teleconference date was the 28th. That's a Wednesday.

Member Anderson: Yes.

Mr. Katz: Okay. Okay, thank you, Andy.

Member Anderson: Well, I don't know. I think that's when I -- meeting. So earlier in the week or Tuesday would have been better.

Mr. Katz: That doesn't work for you. Is that what you're saying?

Member Anderson: Well, it might. It's usually the day I travel. I can see it being travel.

Mr. Katz: Why don't we just push it up till -- if we can shift that back to Tuesday.

Member Anderson: Tuesday, Wednesday is ideal.

Mr. Katz: This is October. So instead of the 28th it would be the 27th.

Member Anderson: Right.

Mr. Katz: Is that good? I don't hear any complaints yet. Let's give people a second. October 27.

Member Anderson: Thank you very much.

Member Clawson: It's all about Andy.

Mr. Katz: It is. It is, Brad. Just reconcile yourself with that.

Member Clawson: At least it's not because --

Mr. Katz: Okay. I haven't heard any complaints. The 27th is okay, 11 a.m. still. Thanks, Andy, for catching that.

All right. And I think the last but not least is the Use of Surrogate Data. And there is no report there. No action there.

So we just got through all of the work session business and we're close enough to a lunch break. So we can be adjourned. But please be back. So, at 1:30 we'll be back for the SEC petitions update from LaVon. Lunchtime. Take care.

(Whereupon, the above-entitled matter went off the

record at 11:50 a.m. and resumed at 1:32 p.m.)

Mr. Katz: Okay, so welcome back. We just finished our lunch break and this is the Advisory Board on Radiation and Worker Health and we're on to afternoon sessions.

Before we get going with that let me check on the line for my Board Members. So, let's run down the list.

Brad, are you there?

Member Clawson: Yes, I am.

Mr. Katz: Oh, you sound much better in terms of clarity, audio clarity. That's great.

Member Clawson: You don't sound any better.

Mr. Katz: I don't sound any -- you know, you'd probably say that no matter what. But, okay.

Let's go on, someone else on the Board. Gen, are you there?

Member Roessler: I'm here. You sound a little better, but you were starting to get a little fuzzy.

Mr. Katz: Fuzzy, okay.

Member Anderson: Hi, it's Andy. I'm here too.

Mr. Katz: Andy.

Member Anderson: Yes.

Mr. Katz: Okay.

Member Schofield: I'm here, Ted.

Mr. Katz: And there's you, Phil. Okay, that's all four of them. And we have everyone back at the table as well.

So, keep giving us feedback as you have issues with understanding what we're saying here.

But we have now a session on the SEC petition update from LaVon Rutherford.

Mr. Rutherford: As soon as we can figure out how to advance the slides.

Mr. Katz: Larry, Joe, Louis or whoever, figure out the slides.

Oh, and also I guess let me just give you all a heads-up. This is going to be a little bit odd because we got through a lot of our work session before the lunch break.

So we have -- we had 45 minutes set aside for Board work session following LaVon's presentation. We are surely not going to need that because we only have one item left, the public comments to address from the last meeting and that's it.

Unfortunately the next session after that is coworker modeling guidelines review and then the SRS update. And that really needs to be time certain at 2:30. We can't -- so what we're going to end up with is another break after I do the public comments. And I don't know, that's not terrible but that's what we're with. And then we'll come back at 2:30. Anyway, so LaVon.

SEC Petitions Status Update

Mr. Rutherford: All right. I'm going to give the SEC update. We give this update at every Advisory Board meeting. This allows the Advisory Board Members, Work Groups and such to prepare and schedule for future meetings, whether those be Work Group meetings or Advisory Board meetings.

Also I'm going to talk about petitions that are in qualification, under evaluation, currently under Board review, and potential 83.14s.

Okay. This is a summary slide. To date we've had 255 petitions. We have three petitions that are in the qualification phase.

One petition evaluation that's currently in progress -- actually there's two, that is wrong, I apologize -- and I'll get to that in a second.

And we have 10 reports with the Advisory Board.

Petitions in qualification. Reduction Pilot Plant. Those who may remember at the last Board meeting we talked about this one. We had this petition. However, the period that the petitioner was looking at, 1976 to 1978, actually was not fully a covered period. We had identified information that we felt may support expanding that covered period. We provided that to Department of Labor. The Department of Labor returned in mid-November a letter back to us agreeing with us and they extended that covered period. So, I indicated that the qualification would be this month. We actually qualified that petition today. So that is an evaluation that will take place and a report will come to the Advisory Board.

ANL-East. This is another petition that is in the qualification phase, 1975 to 1981. It's for all employees. And we anticipate making that qualification determination sometime in January.

BWXT. This is a petition for the residual period, 1973 to 1984. I think some Board Members will remember that we actually have added Classes for both ends of the operational period at this one. So this is the residual period again, 1973 to 1984. We expect to make a qualification determination in January.

Lawrence Livermore National Lab. This is a petition evaluation that's underway. This actually addresses the remaining years of an existing petition, the 1990 to 2014. We've been working on this one for some time. We have got all the information in. However, there are a couple of issues we are working on. We anticipate having this report out in April. I don't think it will be in time for the meeting though, in April.

Y-12 Plant. Again this addresses the remaining years of an existing petition. If you remember last Board meeting we actually recommended adding a Class at Y-12. And we indicated at that time we had a reserve period. We knew there was data at the site. We were waiting to get that data. We are still working on getting that data. However, we anticipate completing that report in June of next year.

Okay, these are petition evaluations that are with the Advisory Board and have some period that needs to be addressed. I'm not going to get into too much detail since we've already talked about the Work Groups associated with these just earlier this morning.

Hanford. Again, we've got a White Paper coming out this month to the Work Group. Savannah River Site, an update this afternoon.

Los Alamos National Lab. We're waiting on a number of documents and we're working to get our sampling plan together for that one.

Sandia National Lab. Again, there's a tour in January and an SC&A report due to us, so that one's moving along.

INL we discussed earlier, working -- some issues there. ANL-West as well.

Santa Susana, we expect to have a presentation at the April Board meeting, our review of the additional documents provided by the petitioner as well as a chronology of the things that we've addressed to date.

Metals and Controls Work Group meeting in January.

De Soto Avenue goes along with Santa Susana.

And Superior Steel, I think Dr. Ziemer mentioned a Work Group meeting I think in February for that

one. So we have actions there, we have a path forward for everything to move forward.

Again, these are the time periods that are remaining. All these are petitions that had a broader time period. However, these are years that are remaining that are left to be addressed. And all those I've spoke to already.

Potential 83.14s. Everyone will remember we added a Class at West Valley Demonstration Project. It was the 1969 through a period. However, we held off on the '66 through '68 period because we had identified a significant amount of data that we wasn't sure it was warranted. We're continuing that evaluation and I don't have a good date for that. However, we will report back to the Board once we have that.

And that's all I've got. Questions?

Mr. Katz: So then it seems De Soto will be ready for April.

Mr. Rutherford: Well I think that, you know, depending how the back and forth goes. But I think yes.

Board Work Session

Mr. Katz: Okay. So, Board Members, questions for LaVon? I don't see any in the room. Any Board Members on the phone have questions for LaVon? Okay, thanks. That's helpful.

You didn't have anyone make fun of you this time. You miss it, I'm sure. I'm just not as mean as Jim Melius.

All right then. So, we have Board work session. All I have left for the Board work session though is to run through the public comments, responses to the August public comments. So I'll do that.

And you have to bear with me. The material I have is in a font 4 or something my children can read,

but I have a hard time with.

And so we had a set of comments from -- on West Valley from one of the petitioners, the petitioner representative, petitioner/petitioner. And these were all sort of process questions in a sense, or let's see. I'll be careful about this. But, they're about understanding why was a particular claimant selected for the 83.14 to sign the petition in effect. Because 83.14s, as people know, are cases where NIOSH is deciding to add a Class and just needs to establish a dose reconstruction case that it cannot complete. So that's the origin, that's how that comes about. It's when we hit a dose reconstruction we can't complete, that -- so that is how someone gets selected to be the petitioner in those cases.

And then there were questions about the process, like changing the time frame. These are questions that come up frequently about the time frame in any given site, why it's been changed by NIOSH. And NIOSH has responded on the matter to -- explaining what the variables are that were relevant there.

And then the petitioner also had procedural concerns about communications with the petitioners, whether the petitioners are being kept abreast appropriately, or with this 83.14 case whether the authorized representative was informed. Again, this is just -- these are process questions. I think they're all responded to appropriately. I don't think there's anything to address here. And that's it for West Valley.

The next -- okay. So, and then the next site for which we had comments was Santa Susana.

Well, I think the simplest way to deal with these -- I mean, a lot of this is commentary and related to, as we've discussed already today, submitting new documents that were submitted for the petition for Santa Susana. This is Area IV we're talking about here, not De Soto. And those are being addressed in reports. So there is an SC&A report and there will

be a NIOSH report which will cover the documents submitted, what they are, what they aren't, and how they're relevant or not relevant for the petition.

And the report will also address petitioner concerns that were raised, that was discussed by Dr. Richardson. He thought that would be good to have those addressed directly in a report. So that's all coming. I don't think I need to -- there's anything to cover here. It's a reiteration of all that.

Then we have Y-12. So, these were questions about -- there's some question about particulars covered in the statement, in the Evaluation Report by NIOSH and that's been responded to by the lead.

There's a comment about concerns about the extent of exposure monitoring of a certain sort, particularly related to fecal sampling, and explanation of why that is not of concern for the evaluation again by the lead, Lara Hughes.

There's a very general statement that the petitioner consulted the statistician who couldn't reproduce NIOSH calculations. And the NIOSH response there, as I think it can only be, is that it's really difficult for them to respond to that kind of general concern.

And then there was a concern about paying attention to the document from DOE that was submitted. And in response, that document was reviewed as part of the evaluation review.

Okay. Let's see. There's some comments that don't require a response, just comments. That covers Y-12.

Okay, Rocky Flats. Okay, so these Rocky Flats comments are really comments, not questions, that don't really require a response.

Then we have the Oak Ridge sites. We have a comment in favor of expanding the SEC Class. That doesn't require a response.

Another comment on the Oak Ridge sites, again not requiring a response, about the difficulty of finding records for people who worked in a certain division there.

And there was -- okay. And then the rest also doesn't require responses. For example, we have a Rocky Flats comment, someone offering themselves up for expert information. I think their contact information was collected at that meeting for that purpose. Likewise for someone who was a radiation safety officer at Santa Susana, same situation.

And that's it, that gets through the comments. Any questions from Board Members about these responses? Yes, Paul.

Member Ziemer: Just for clarity, do these comments, do these show up in the table? I didn't see them there.

Mr. Katz: No, because they have personal information.

Member Ziemer: Personal information.

Mr. Katz: Yes.

Member Ziemer: But all of these are from the transcript. The comments are in the transcript.

Mr. Katz: Yes. Just the same, yes.

Member Ziemer: Are the responses necessarily sent to the commenter, or only if --

Mr. Katz: There's a lot of different issues. So, the ones that don't require a response aren't responded to. Often staff get on the phone with the individual and have a conversation about these and that's the way they respond. It's not that frequent that it's done in writing I don't think, but it could be back and forth in emails.

Member Ziemer: I was trying to get some clarity in my own mind as to sort of the affirmation that the

loop is closed, not just with the Board but with the commenter. Thank you.

Mr. Katz: Sure. Okay, then. Then we are on break until we have our coworker modeling Santa Susana discussion which begins at 2:30 local time here.

(Whereupon, the above-entitled matter went off the record at 1:51 p.m. and resumed at 2:31 p.m.)

Mr. Katz: Okay, yes, we're here. We're live.

All right, before we get started let me just check on the line and make sure I have my Board Members. Gen, are you there?

Member Roessler: I'm here.

Mr. Katz: And Phil, are you there?

Member Schofield: Here.

Mr. Katz: And Brad?

Member Clawson: Yes, I'm here.

Mr. Katz: And Andy.

Member Anderson: I'm here.

Coworker Modeling Guidelines Review and Update on Savannah River Site SEC Petition #103

Mr. Katz: Super. Okay. Now we have a session, it's sort of a two-part session. It's doing two things.

The Board has draft guidelines on the use of coworker data, or co-exposure data is the terminology we're using now, which actually is a much better term.

And the Board has tentatively approved those guidelines and wanted to see how they would work in the real world, and the real world in this case is Savannah River Site co-exposure data.

So, the first part of this session is to address that

question and we'll have presentations from Tim Taulbee and Bob Barton as well. And they have coordinated a bit last week, Thursday and Friday, as this is very fresh. We had a day and a half meeting on this and on the second part of this, just mirroring the session today.

But where they were into a lot of details, you're going to get today a more summary version, including an update because there were some things accomplished in that meeting, and you'll hear about those. And following then this part A which is again this coworker, co-exposure data guidelines, then we'll get into an update on the Savannah River Site petition.

And that is as we discussed last week, and the petitioners were on the line and representatives of the folks there in Savannah were on the line, so I think they're well apprised. But it's just an update. We're not going to have action on that SEC petition today.

We are aiming working towards having action on that petition in April. So there will be Work Group meetings following this meeting, this winter, late winter, spring, to hopefully bring us to the point where in April we can take action and put to bed part or all, however it works out, of the remaining part of the petition that's still with us.

So I think that takes care of all I want to say.

So, following this piece on the coworker exposure we'll have the SRS update and I think Tim will have some words for that, but part of your presentation will address that too, right?

Dr. Taulbee: Yes.

Mr. Katz: And then I think Joe Fitzgerald from SC&A will follow with some comments too, is that correct? Oh, answer questions. I see, I get it. Okay. So Joe will be available for discussion on that.

And with no further ado then Tim, take it away. Thanks.

Dr. Taulbee: Okay. Thank you, Ted. Ted just gave a really good background so that's going to take care of a lot of my slides here at the beginning, but that's good.

One thing that I wanted to say before I got going here in talking about the Co-exposure Model Implementation Guide and using the SRS co-exposure model as an example is I wanted to thank the ORAU team who developed this particular method for co-exposure modeling.

And the team was led by Chris Tornes and Liz Brackett, and Matt Arno did the intake modeling, and Nancy Chalmers was statistical support.

Mr. Katz: Tim, given the noise coming through the wall too just --

(Simultaneous speaking.)

Dr. Taulbee: Is that better?

Mr. Katz: For the folks on the phone. I don't know what they're hearing, but it couldn't be that great.

Dr. Taulbee: Can people on the phone hear me okay?

Member Schofield: Yes.

Member Roessler: Ted, you have an echo.

Member Anderson: It sounds like you're out on the street, but that's okay.

Mr. Katz: That's where I belong. Exactly. So I'll stop talking.

Member Anderson: It's not overwhelming.

Mr. Katz: That will take care of my echo. Go ahead, Tim.

Dr. Taulbee: Okay. All right, thank you. So a little bit of an overview of what we're going to go through here today.

And Ted hit on this at the beginning. We did a name change here. We've referred to coworker in the past. And really this is a co-exposure model instead of a coworker model. This was a discussion within the respective Work Groups, the SEC Issues Work Group as well as the SRS Work Group. And we decided on a name change to be more specific and improve the communication for clarity. So, I'll use these interchangeably kind of by accident because I'm used to saying coworker, but hopefully in the future we'll be referring more to co-exposure model instead of coworker model.

I'm going to go through a little bit of the background leading to the development of the co-exposure model criteria and the draft criteria for the evaluation and use of coworker datasets. You see I switched back there, but that's because that's the title of the original draft document. And then go through the Savannah River co-exposure model example and wrap up here with a summary.

At that point I'm going to turn it over to Bob Barton who's going to go through SC&A's comments on this particular model, and then the Work Group deliberations that happened last Thursday and Friday.

So this is, as Ted indicated, fresh off the press.

So leading with a little bit of background. Back in 2010 which is almost 10 years ago there was some concern that the co-exposure models using raw bioassay data could be dominated by a few individuals. And this would be a case where somebody was involved in an incident and left 50 to 100 bioassay samples. And when you looked at that across the entire collection of bioassay sampling, that could really dominate the model. And so it's really not a co-exposure model, it would be a one-person model. And so RPRT-53 was written back

then and developed what we call one person, one statistic.

Following that particular methodology there were multiple SEC Issues Work Group meetings discussing what we called OPOS at the time, stratification, statistical comparison methodologies. And what ended up coming out of a lot of those discussions was a Time-Weighted One Person, One Statistic, what we call TWOPOS. But also coming out of those discussions were this is what promulgated the development of the draft criteria for the evaluation and use of coworker datasets. And this was drafted by Jim Neton, my predecessor who came up with this criteria of things that we needed to evaluate. And that's what Ted was talking about that the Board had previously looked at and had agreed with in principle but wanted to see an example.

So the general timeline of this implementation guide was starting in June of 2014. And you can see the dates there going through. And the final version was July 6, 2015. And you'll see the rev was 4.1.1 because that last revision was really just some wording changes that took place. But at that time is when the SEC Issues Work Group requested a demonstration or a pilot example showing how we would actually implement this guide.

And so that's what I'm going to go through here. I'm going to start out with the draft criteria that was put out by Dr. Neton, and then at that point we'll go into the SRS example.

So some of the things that we needed to evaluate the elements of the Co-exposure Model Implementation Guide are in evaluation stratification, data adequacy, data completeness and validation, the applicability of the model to unmonitored workers, and then the analysis and application which is kind of the -- similar to the step above, but slightly different to the unmonitored population.

So I'll start here with data adequacy first. And this was to be a review of the sampling methods, the laboratory analysis. And in doing so consideration should be given to the representativeness of the bioassay collection methods, the radiochemical recoveries, the counting efficiencies, the reliability of the measurement methods.

For data completeness we were to evaluate whether the data are either sufficiently representative or bounding of the exposure potential. And there was recommendations in there of using a minimum 30 person-measurements per year and we are to assess temporal trends, gap analysis, assess the data quality, the accuracy of data transcription, and then the evaluation of potentially missing data such as comparing this to the claimant files.

In the applicability to unmonitored workers there was a hierarchy that Dr. Neton put into this criteria and that was threefold here.

The first was to use routine representative sampling for the co-exposure model.

The second was to use routine measurements of the highest exposure-potential workers. So these would be workers who are identified as having that greatest potential for exposure. And if you could develop the co-exposure model with them that would be a bounding scenario.

And finally from the hierarchy was the collection of samples after the identification of incidents. So this would be an incident-based model, a co-exposure model.

And the whole goal here was to either get a representative sample of the exposed population, or workers with the highest potential for exposure. So it was one or the other would be the criteria here.

The next step was the analysis and application to the unmonitored population. And this was, was there sufficient data to construct a representative

co-exposure model or a bounding model. And again the recommendation was to use 30 workers per time interval. However, less data could be used if the data fit a distribution reasonably well. And this was left up to the judgment of the statistician. The statistician looks at each one of these fits. So this isn't being done by a health physicist. This is somebody who is professionally trained to really look at data intently and determine if the data can be reasonably represented by a statistical distribution.

This is where the Time-Weighted One Person, One Statistic comes into play. And this is when multiple bioassay samples are present during a monitoring period for a given individual.

It's appropriate to average the values so that a single statistic can be computed for that individual. So one individual isn't dominating the whole model.

And then the next, the final stage which really becomes the first stage which I'll get into in a minute here is -- there should be an evaluation of stratification, or it should be evaluated when there's accurate job titles and descriptions can be obtained for all workers, there's a reason to believe that one job category is more highly exposed, and there is unmonitored workers in this job category.

And a couple of examples I would give you here is there are times when we look at a dataset, even I've seen this in external dose already, where we're looking for -- there's one population that has higher neutron exposures, let's say. And you go in and you look at everybody in that particular work group was monitored for the neutron exposures including the secretaries and the clerks that were in that work group. So from that standpoint that particular group doesn't really need to be stratified out. They can be stratified out, but they're not really part of -- there's no unmonitored workers that would be needing that particular exposure.

The stratification by individual job categories was

never really our intention from the standpoint of co-exposure models. It was more general groups of workers.

In the case of Savannah River that I'll give you here in a minute it comes down to construction trades versus non-construction trades. But it could be other strata that we would look at.

So, when talking about the Savannah River co-exposure model and the pilot that we did we initially came out with a pilot example for what we call OTIB-81 Revision 3, and that was in November of 2016. And it had three radionuclides in it. It was the trivalents which is americium, curium and californium. So that's three, but it's really one count. Tritium and thorium. And subsequent discussions on the stratification and applicability of subcontractor construction trades workers in this group led to a general Work Group consensus that they wanted to see the full models to evaluate all aspects.

So we had initially intended to provide these three that we could work out all of these details, but it turns out that folks wanted to see the whole thing which is perfectly reasonable, so no problems there. The difficulty was is this took us another couple of years to develop, to go through. And I think at the end of this presentation or by the time we get through it you'll see why that occurred with all of the details that we had to go through with the datasets. So, the final one was OTIB-81 Rev 4. And this was released in March of this year. And this contained models for all radionuclides.

So the first thing within the co-exposure modeling was the stratification decision. And we went back and forth internally a lot on this and reviewing some of the transcripts and input from the discussions that the Work Groups had had.

And we decided *a priori* to stratify based on differences of exposure potential between routine and non-routine operations. Because we found it

difficult to make the argument that the exposure potential was similar for these two types of workers.

For example, consider when a glovebox is purposely breached. You have the loss of engineering control that is used to protect the operations workers. Whenever they're doing their work there's a glovebox face in front of them, they've got their hands in it, they're making their product. But then you take the face of the glovebox off for construction trades to come in and do their work. Now they're wearing respirators. That's the protection that they have. So we stratified based upon this routine and non-routine type of work scenario.

And in reality how it gets stratified is something that we will continue to work with the SRS and SEC Issues Work Groups to nail down. But for us the reality was in the initial construction trades versus non-construction trades stratification, that was the hard part. Going through with all of the data and figuring out for this particular person's bioassay at that time, were they a construction trades worker or were they an operations worker.

We've demonstrated in this model Rev 4 that we have sufficient data to stratify the workforce. The question is how we should stratify it. We picked *a priori* to go routine and non-routine operations which translates to construction trades and non-construction trades. What remains unclear to us is, is that the right strata and those will be further discussions we'll be having with the Work Group when we reconvene. Because is stratification completely needed? Is construction trades, non-construction trades okay? Should we be stratifying on subcontractors versus non-subcontractors? Those are discussions that are to take place. But for this purpose of the demonstration we've shown that we can stratify here and that's what we'll go through for this example here.

So for Savannah River co-exposure models, which

ones are needed? ORAU-OTIB-18 which is a bounding approach using air monitoring actually takes care of a large number of claimants who would need a co-exposure model. And this is because a lot of the claimants that we have that are not monitored don't have metabolic cancers. And so this bounding approach ends up resulting in an overestimate of their dose and we can process the claim.

The goal of the co-exposure model is to supplement ORAU-OTIB-18 with a best estimate co-exposure model. For those cases where the decision rides on -- not an overestimate or an underestimate, but we can use -- we need a best estimate.

So from this we decided that we needed a co-exposure model for all the major radionuclides at Savannah River because these are the ones that we could potentially get claims for. So there's nine of them. There's the trivalents which is americium, curium and californium. At some sites these are called exotic radionuclides. At Savannah River they're not as exotic because they actually produce this material.There's tritium, plutonium, uranium, fission products which includes strontium, cobalt-60, cesium-137, neptunium and thorium. Those are the nine co-exposure models that we developed.

Now with that *a priori* stratification that we did there's actually 18 models here. So there's each of those nine radionuclides, one for construction trades and one for non-construction trades. So there's a lot of work that went into this particular effort. So how OTIB-81 is organized is based upon the radionuclide that we are presenting and modeling here.

And the format for the discussion closely follows that implementation guide. It starts with data adequacy, goes on to data validation. The data adequacy discusses personal monitoring, the applicability, the bioassay analysis techniques, and then the data validation goes through completeness and interpretation and exclusion. We get to the

statistical analysis, the development of the TWOPOS values and then the intake model.

So these four methods is what you will see within the OTIB-81 as far as following the discussion. So I want to walk you through the plutonium co-exposure model for Savannah River for non-construction trades workers to give the example here. Keep in mind there's a lot of data that we could be going through. I'm trying to give an abbreviated version here.

So in walking through this we'll start with data adequacy. And we looked at the personal monitoring, who was monitored. And there are bioassay control procedures starting in 1968 -- this is in Attachment C of the report -- that identify the types of workers, the frequency of monitoring within specific areas.

One of the things with construction trades workers, they were monitored every three years for plutonium.

The applicability to unmonitored workers. And this would be the number of workers monitored was relatively constant over time. So there were no temporal gaps.

Workers with the highest exposure potential were monitored more frequently.

How do we know that? Well, if you look at this particular table in Attachment C. And I know you can't read it there because last week when I put it up on the screen I realized nobody could read it either so I'll summarize the plutonium one in the next slide. But across the columns that you see is plutonium, enriched uranium, uranium, induced activity or fission products, the americium, curium, californium, strontium, tritium. And so for each area which is the far left column there's different frequencies associated with these radionuclides.

So let's just look here at the plutonium one. And

they separated the workers in this time period -- that was 1976 by the way, the example that I'm giving here -- into workers with a low potential for exposure, a medium potential for exposure, and a high potential for exposure.

The low potential exposure was workers in the tritium facilities, the 100 areas which would be the reactors. 305-M was a reactor. 773-A, select personnel which would be supervisors and clerical people as well as reactor engineering from 773-A, all people who really don't work directly with plutonium. And so their sampling frequency was once every three years.

The people with the medium potential that I would call for an exposure to plutonium were those in the 221-F and H canyons. The A-Line was the uranium line. 235-F, people who worked in the non-process areas of that building, and people in 772-F who worked in the non-process areas, and those in 321-M.

The sampling frequency for those workers was once per year. They would leave one plutonium sample per year.

People with a high potential for exposure would be those who worked in the HB line, FB line, and JB line.

These were the three plutonium production lines. This is where they took the plutonium solutions coming out of the canyons and turned them into plutonium metal.

Also 235-F, the process area and 772-F, and then select personnel in 773 which were part of the analytical chemistry division, the high-level caves, et cetera. They were sampled for plutonium four times a year.

So you can see that their monitoring frequency that we would see in the bioassays follows their exposure potential. So we know the highest

exposed workers were sampled more frequently.

So next we looked at the analysis method. These would be the bioassay techniques. 1954, there was a bismuth phosphate method and lanthanum fluoride co-precipitation.

Fifty-nine was a nitric acid/hydrogen peroxide dissolution. 1966, TIOA, liquid extraction, and '81 was a co-precipitation technique with alpha spectrometry.

Another part of the analysis method that we looked at is the censoring level or the reporting level.

And for plutonium it was 0.1 disintegrations per minute per day. This is a reporting level, not necessarily a limit of detection, or a minimum detectable activity.

And to give an example of that, if you look at the plutonium logbooks you'll see in here the dpm per 1.5 liters, this is a dpm per day. And you can see the very top result is 0.029 dpm per 1.5 liter. What appears in the worker's record is less than 0.1.

So most of the workers' records have this less than value. That was an action level where they would begin to do follow-up at the site. But there is the uncensored values that are available. However, most of our models were using the 0.1, less than 0.1.

So with plutonium and data interpretation, most of the measurements were gross alpha after chemical extraction or chemical separations.

During the 1980s, plutonium-238 and 239 were reported separately. We merged these into a gross alpha result in order to be consistent and we made a claimant-favorable assumption and assumed 12 percent of 10-year aged plutonium.

There were some data that we excluded from this. The draft criteria indicated that we should identify

what data we were excluding.

Some of the data we excluded were those chelation samples, or indication of DTPA use. And the primary reason for this was that the -- when you chelate an individual to remove the plutonium faster you're interrupting the biokinetic model which is what we use to estimate the intake rate based upon urinalysis. So those samples were removed.

As well as there were some samples who had lost in process where something happened in the lab and they would do a re-sample. If it had an LIP next to it, we removed those values.

Also, some had insufficient identifying information. And then there were some samples that were given per unit mass which are likely fecal samples and again that's a different biokinetic model than the urine model that we were using.

The next phase that we went through was looking at the data validation. And this was, for the plutonium model we used the NOCTS in vitro dataset.

I showed you earlier logbooks. There's a lot more plutonium data that ares available. However, we are using NOCTS as a representative sample.

We had sufficient data there that were already coded that we could use. This particular in vitro dataset contained plutonium, uranium, enriched uranium, and fission products.

We separated the acceptance criteria of the dataset into two categories, critical fields and all other fields.

The critical fields we felt were the isotope and the result. And the result included that less-than value.

And so to get to 1 percent from this data set -- and by the way, this data set n was equal to 303,000 entries. Yes, 303,000 entries.

So we checked -- 4,386 entries were checked. And

there were 11 errors. So our error rate was 0.25 percent with a 95th percent confidence interval of 0.13 to 0.45 percent.

Then we checked all of the other fields which included last name, first name, middle name, payroll ID, date, units, and then the area.

Because we had a higher acceptance criteria rate of 5 percent we didn't have to check as many fields. Eight hundred and seventy-four fields were checked and there were four errors in this dataset, so 0.46 percent was our error rate within that dataset with a confidence interval from 0.13 to 1.17.

So we did this for each of the datasets that we were using here. So this took a lot of time to go through, develop, clean the datasets, and then go through and do the checking.

The next part of the analysis was the time-weighted one person one statistic methodology. Again, we used RPRT-53 which was an analysis of stratified co-exposure coworker data sets. The title is a little misleading from what ended up coming out of that. The TWOPOS data are fit to a log-normal distribution during the statistical analysis.

I want to reemphasize that most of the bioassay data is censored, reported as less than some value. And in fact generally the datasets are censored more than 75 percent. To fill in for that censored data what we used was a multiple imputation technique. And this is outlined in RPRT-96, Multiple Imputation Applied to Bioassay Co-exposure Models. And this will be discussed more by Bob and the Work Group and there's more work to be done here as to what method we use here. But this is what we propose to use. This is what we think is right. And what we do for the multiple imputation methodology is we fit the bioassay data, the upper tail of it, and assume that it extrapolates down as a log-normal distribution.

The example I'm giving here is 1969. And so based

upon this particular fit, the left-hand graph that I've got, we then calculate the TWOPOS value.

And some people, they have no censored values, and so from that standpoint those would be the black dots on the graph on the right.

Some people, less than 50 percent of their values are censored. When they do have a censored value we'll go to the chart on the left and we will grab -- randomly grab a value between the censoring level of 0.1 and down to nearly zero, but following that log-normal distribution.

So we'll pick a sample out of there, calculate their TWOPOS value.

We do the same thing for people who have multiple samples that are censored. We might pull two samples out of there, or three. However many censored values they have we will go and grab them from that graph on the left and then impute, calculate their TWOPOS values.

The graph on the right is the first run of the multiple imputation. So this is our first simulation of going through and doing this. We do this multiple times, over and over, to end up with this particular type of a graph in data.

And you can see that the spread toward the left end of the log-normal distribution begins to widen out as one would expect.

From this TWOPOS plot for each year -- and actually each year and each strata; this is the 1969 non-construction trades worker strata -- we will extract the 50th percentile and the 84th percentile from along that red line that's on there. This is assuming a log-normal distribution. And from that we develop what we call the TWOPOS data table here. And I've listed here the results from 1967 through 1970. And you can see the 50th and the 84th percentile.

We do calculate the GSD from that and then the

next column over lists the number of workers that were involved in that TWOPOS model or log-normal model that we use.

And here we've got construction trades workers in the first, or the second through fifth columns, and then non-construction trades workers -- I'm sorry, construction trades workers on the next set.

So now from this TWOPOS data, again we're using the 50th percentile and the 84th percentile. Using that data for each solubility type now we do the intake model. So now we've got each radionuclide separated by non-construction trades and construction trades workers and each solubility type that we could possibly end up applying to a worker which can vary as far as what their organ dose comes out to be.

And here's where the internal dosimetrist earns their money. This is a difficult task of selecting the time intervals of similar results, but this is what they do in real life as far as figuring out how to model bioassay data.

What they do is they assume a chronic intake scenario for each time interval to determine the intake. So we're looking at the bioassay data and trying to model what intake would give an output of bioassay that looks like that. And so I'm going to walk you through this example pretty quick here.

But in this case the first intake interval is those first six blue data points. So this would be from 1955 to 1960. The internal dosimetrist came up with a chronic intake of a particular value that would give, bioassay that would follow that black line that I'm showing, if they were only exposed during those first six years.

Then they look at the next time interval, and this will be '61 to '66. And again it happened to be six.

Then you see the data jump up, at least from the bioassay standpoint. And so these will be the

TWOPOS data by the way that I'm looking at, the 50th percentile.

And so the intake increases during this particular time interval. And this would be four years, before it begins to fall back down.

And so the fourth interval would be '71 to '81 and this would be the intake value. And then the final data set would be '82 to '90 that's modeled here.

So these are the five periods that I just walked through that the internal dosimetrist comes up with and what they come up with is a 50th percentile intake rate. So this is in dpm per day.

They repeat that exact process I just showed you for the 84th percentile. So they take the 84th percentile data and do it again.

From that we calculate the geometric standard deviation, this column right here. And you'll notice here that the next column is an adjusted GSD.

If any of these geometric standard deviations in this first one are less than three we increase them to three because that's the minimum that we use for uncertainty in internal dose calculations. So that's why that changed from 2.98 to 3.

Then from the 50th percentile and this adjusted geometric standard deviation, we calculate the 95th percentile of this distribution.

This would be the intake distribution that if a worker was exposed or we are assigning this particular dose we would look at their employment dates of when we are going to start that particular exposure and then assign these particular values into their intake model that we would do to calculate dose for their particular cancer.

If a worker worked for all these years, 1955 through 1989, and we assigned all of those intake values over that whole time period, their urine excretion

would follow this green line.

And you can see that this cumulative model is over-predicting what we see in the actual bioassay. And this would be the 50th percentile. And this would be the 84th percentile.

And so what I've superimposed on here is a blue line indicating what that censoring level is.

And what you'll see here is that if a worker that we were assigning this data to that was not monitored, if they had been given a bioassay sample in the latter years, it would have shown up positive with this type of an intake.

So we feel that this is claimant-favorable, but it's reasonable and sufficiently accurate for a coworker model.

This is just another version of that previous graph that I've got. The box and whisker plots are the distributions of the TWOPOS data with the red being the geometric mean or the 50th percentile and the blue dots being the 84th percentile of what would be predicted in the urine if somebody was exposed over this whole time interval.

So we did this for plutonium that I just showed you. We did it for americium. Here's those particular results. And then tritium.

Tritium is a little different because we could use dose. We didn't have to go to intake.

And one thing to note here with the tritium is post 1980 time period, these models are all less than 100 millirem for the Savannah River Site here.

We did it for uranium, for Type F, Type M, Type S. The plutonium by the way example I gave you was Type M. We also did Type S from that. But here this is to demonstrate that we've got multiple different solubility types and you have to do this for each solubility type that you're going to assume.

Also for cesium. And then neptunium is a little different, a little interesting. We had to break this into two parts because we have two different monitoring methods. The first part was urinalysis. That's the graph over here off to the right at the top.

And then we switched to whole body count data. And the sum of the two is what you see in the large graph here with the step function change here around 1970.

And the reason we had to do that is you see that the urinalysis data is quite sparse in that time period. But we do have the whole body count data that we could use and develop a co-exposure model.

What we superimposed here in the 1980s time frame, we did have a significant amount of actual urinalysis data and we wanted to see how does this model fall with the data that we do have. And clearly from this example here we are bounding in this particular scenario for neptunium.

So the next step would be the application of the co-exposure model to the unmonitored workers.

Normally the 50th percentile with a full log-normal distribution will be assigned to workers who may have been exposed to greater than environmental levels, but less than a typical operations worker.

So, this would be somebody who intermittently went into an area. And in this case because I'm looking at non-construction trades workers here, this would be a clerk or somebody who goes into an area and was not monitored.

Workers considered to have a high potential for exposure may be assigned something higher like the 95th percentile of the co-exposure model distribution on a case-by-case basis as determined by the dose reconstructor.

But this would be something the dose reconstructor would look at and then make that judgment based upon a lot of other data that could be available within the claimant file.

So, this example of the co-exposure model demonstrates how the draft criteria for evaluation and use of coworker datasets would be implemented.

We believe the intent of the draft criteria for evaluation and use of co-exposure datasets has been met. Some of these words here got jumbled here. I apologize for that.

NIOSH believes the co-exposure models presented are claimant-favorable, reasonable, best estimate and adequately bound the potential doses for compensation purposes.

So, our next steps is that now that the Work Groups have approved this methodology is we're going to go and take that draft guidance and turn it into finalized guidance and post it on our web. We will be changing the name to co-exposure model so you might see that within the report, but that will be the only change. And then we'll start implementing this method across all the sites where co-exposure models are needed.

Just to let you know, this implementation of this methodology is going to take some significant time. It's going to take years to get these updated.

So as we get new models updated and start using them we will of course be doing a PER looking at past dose reconstructions in all cases to make sure that nobody's claim would change, or if they do change, to notify the Department of Labor and redo those dose reconstructions.

And with that I'll turn this over to Bob Barton where SC&A reviewed the co-exposure model.

Mr. Barton: Thank you, Tim. I guess just to start off

I'd like to recognize the SC&A team that worked very hard on this review. That's Ron Buchanan, Harry Chmelynski, Rose Gogliotti, and Joyce Lipzstein.

Our review identified six findings and seven observations which I'd like to give sort of a bird's eye view of now, not to get down into a lot of the details but to update the Board as to what was discussed and any resolution and our path forward that resulted from last week's joint meeting. So Finding 1. This has to do with what we call bioassay variability, but really what we're talking about is data adequacy.

And just to give a little bit of background so this finding makes sense, what they were doing at SRS for those trivalent actinide samples. Again, that's americium, curium, and californium is they take an individual urine sample, a single voiding, and they would split it out onto different discs or planchettes if you want to think about it that way so that they could measure it multiple times.

Now, what we recognize, and this discussion actually goes back a number of years, is that even at the high levels, levels much larger than a censoring level, we were seeing significant variation between measurements of what is the same exact urine sample, just measured on a different disc.

And so that certainly gave us concern from a data adequacy standpoint which the implementation guide really describes as does the data we're looking at sufficiently reflect the exposures with which we're trying to reconstruct here. And when we saw that kind of variation it certainly gave us pause.

A discussion with the SEC Issues Work Group and the Savannah River Site Work Group, the tasking really came back to us on that, that we really need to go in and look at the actual analytical methods that were employed and the documentation behind those methods to see if there's anything in there

that troubles us.

So that would be things like the chemical extraction method, the detectors that were used, the detector efficiencies, anything in there that might explain this variability which really gave us concern. So that was Finding 1 which is SC&A's action item.

Finding 2, and this has to do -- Finding 2, Finding 3 and Observations number 1 and 2 all really have to do with this multiple imputation method which Tim described.

And really what we're talking about is when you have a dataset with all these bioassay results that are less than the detection limit or the censoring level and you don't really know what the true number is below that less than result what do you do with that data.

NIOSH has developed the multiple imputation method. This method has been actually used in some external dosimetry applications, but this is really the first time it's been used in a coworker model.

And as Tim mentioned, RPRT-0096 details that method and how it was developed. And RPRT-0096 was issued earlier this year in January I believe.

So again, Finding 2, 3 and Observations 1 and 2 really all have to do with this multiple imputation method. And really they have the same status.

So Finding 2 was the use of imputed values that are less than one-half of the MDA raises a fundamental fairness issue in that monitored workers who have bioassay results that are less than the MDA are assigned a missed dose.

This is in accordance with ORAU-OTIB-0060, the internal dose reconstruction.

Per that guidance if you are a monitored worker and you have a result that is less than the detection

limit it's evaluated at essentially one-half of that detection limit.

So we looked at that and then we compared it to some of the coworker values that were developed using the multiple imputation method.

And we noticed that the results, the resulting coworker representative bioassay results were often much less than the MDA, and often much less than one-half of the MDA. So that certainly gave us pause.

So what we did in our review was to perform some scoping calculations. Let's come up with a hypothetical worker who has a result that is less than the MDA.

Let's evaluate their dose, their intake, their dose, and then let's calculate a theoretical Probability of Causation.

Then let's take that same worker and assume that hypothetical again, hypothetical worker, and assume that they were assigned the coworker values.

And again, go through the exercise, calculate their assigned dose and then follow it through to the end result of a Probability of Causation.

And I'd just like to note one finding and one of the observations is about those results, that these scoping calculations are purely illustrative. They certainly don't encompass all the different scenarios and factors that really go into these internal dose calculations.

So that was Finding 2 and the status of that is again SC&A was tasked to go and review the actual underlying report, RPRT-0096 where this multiple imputation method was developed and first implemented really in this SRS coworker model.

Observation 1, again related to the multiple

imputation method reads while the multiple imputation method is mathematically correct it has the potential to result in biasing the simulated bioassay results unnecessarily low.

Alternate approaches such as the maximum possible mean method which replaces censored data with the actual censoring limit, or alternatively one-half the censoring limit, would solve the issues associated with datasets containing a large number of censored values in a claimant-favorable manner.

So again this goes to what do we do when we have all of these bioassay results that are less than some limit and we really don't know what the true value is.

So that has the same status as the previous Finding 2 in that we're going to go and we're going to take a critical look at RPRT-0096 and how it fits in with the whole coworker modeling process.

Before I get to Finding 3 I realized just this morning that during all the hustle and bustle I somehow omitted Observation 2 from any of these slides.

So I'll just briefly tell that Observation 2 was also about the scoping calculations.

And what was interesting about it is when we calculated the dose considering a missed dose. So in other words if the worker had a result it was less than the detection limit and we evaluated it as a missed dose the dose was always higher, in many of the scenarios we modeled the dose was higher than what the coworker model would assign.

And you say well, that might seem problematic. However, when you take the next step and you assign uncertainty to that dose the situation changes drastically for the Probability of Causation.

So for example, where we might have two scenarios, one coworker, one missed dose where the missed dose was actually two to five times

higher than the coworker dose the fact that the coworker dose has an uncertainty distribution based on a lognormal with a minimum GSD whereas the missed dose is a triangular distribution, the Probability of Causations actually came out quite similar.

So that was Observation 2, essentially pointing out that based on these scoping calculations it's apparent that the Probability of Causation is really driven by the statistical uncertainty that you place around the dose and not necessarily the magnitude of the dose itself. So that was Observation 2.

And again I apologize that that slide didn't make it in here. However, the presentation that's on the website for SC&A's review of OTIB-0081 has that slide as well as some additional information on that.

Finding 3, again about multiple imputation. This reads the sample comparison of coworker intakes to missed dose method for uranium specifically showed that the coworker model actually derived intakes that were a factor of four higher than the missed dose approach.

This was in comparison to the other contaminants that we evaluated such as plutonium, and mixed fission products.

And this illustrates the potential for inequity between the treatment of an unmonitored worker who's assigned coworker intakes and the monitored workers who have results less than the detection limit.

And again this all falls under the open SC&A action item to actually go back and take a hard look at this multiple imputation method as presented in RPRT-0096 released earlier this year.

Finding 4 moves on to data completeness. As Tim mentioned, the coworker model for SRS is largely based on available NOCTS data, that is the claimant data available to us.

And there was a cutoff point. It was somewhere around August of 2011 which is obviously necessary because you have to make a cutoff somewhere to start your data evaluation. Otherwise you'd be constantly revising.

So at that date in August of 2011 there were about 4,000 claims available for analysis to create this coworker model.

Since that time there have been about another 2,000 claims that have been submitted. So essentially another 50 percent.

Inclusion of this data would be especially important for the two contaminants that required a combination of multiple years for analysis because you simply didn't have a sufficient number of data points to do it on a year by year basis. And that was for uranium and cesium.

This was discussed in depth with the Work Group. And while everyone agrees that it's always better to have more data as it improves your counting statistics and precision the amount of effort including pulling that additional data for those additional claims, stratifying that data into construction workers and non-construction workers, essentially the benefit to the level of resources and effort was deemed to be outweighed.

So the Work Group decided not to pursue the inclusion of this additional data and that finding was closed.

More on data completeness. Observation 3. This is again looking at those trivalents, the americium, curium, californium.

And we noticed that in particular in 1980 and 1982 the number of samples that we have available for coworker analysis was less than what was reported by the site as actually having been analyzed in that year. We're talking around 70 percent roughly.

So the site reported a certain number of samples for that year and we're only seeing roughly 70 percent in those two years in the nineteen eighties.

This observation notes that any changes in operations are not discussed. If you have what could be considered a data gap you really want to take a hard look at the operations and what they were doing to assure that there was nothing going on during that period that could be potentially missed or underestimated by any dose assignments.

Now during that discussion it was actually brought up I believe by a member of ORAU that there's actually documentation that during that time frame there was a whole backlog piling up of bioassay analyses.

So those samples, even though they might have been distributed in those years and the sample was given in those years they might have been actually analyzed years later which is actually somewhat shown by the data in those later years in the nineteen eighties.

So the action item is really to NIOSH there is to provide that reference or references to really document that the reason we're seeing this sort of lull in comparison between the number of samples the site was reporting as having either distributed or received is actually consistent with that backlog that was taking place during that time.

Observation 4. This is actually really just a carryover. This observation appeared even in Revision 3 of the co-exposure model from back in 2016.

And that is OTIB-0081 does not provide a statistical comparison of the two stratified groups as described in the Coworker Implementation Guide.

The various coworker models were stratified based on the a priori assumption that exposure potential between construction trade workers and non-

construction trade workers was different.

Now again, we added this observation in because it was SC&A's mandate not only to review the SRS coworker model specific to issues related to SRS, but also how it followed the coworker guidelines.

So obviously as Tim had mentioned before there's a lot of history to this in that -- we were never really able to develop a proper statistical test that would have the power to differentiate between the two groups.

However, logic really tells us that the non-routinely exposed workers are likely in a different exposure category than those who were exposed more routinely.

And so the status of this is there's really no action required. It's just, it's there to note the fact that the coworker guidelines say that you should perform a statistical analysis after you stratify the groups to see if they're truly different.

And in this case the two groups were stratified a priori.

Observation 5. And this again is about stratification. SC&A believes a quantitative assessment of available job plans rather than a qualitative basis is appropriate to determine that prime contractor and subcontractor CTWs are part of the same exposure strata.

Such an assessment has been performed by NIOSH. A report of their findings has recently been issued.

So essentially this whole issue is about within the OTIB-0081 coworker model there were some anecdotal examples of construction workers on work permits that concluded that prime contractor construction workers were really working side by side with subcontract construction workers and therefore could be considered part of the same strata.

And again that was sort of a qualitative evaluation of it.

Since that time NIOSH has put together an actual quantitative comparison of prime contractors and subcontractors regarding plutonium up till about I believe 1990. That report is SRS Construction Trade Worker Plutonium Stratification Refinement. It's on the website.

So, obviously the status of that is it's getting transferred and being subsumed under the review of that White Paper that I just mentioned. So there's really no action required with regard to OTIB-0081.

Finding 5. This is specific to the classification of the job machinist which we note that in PER-014 was considered a construction trade worker while in OTIB-0081 in the listing of job titles that would be considered construction trades versus non-construction trades, a machinist was considered a non-construction trade.

What NIOSH did in response to this is they actually went through and pulled NOCTS claims that had machinist in the title.

As it turned out a lot of them actually were -- even though in the table it shows machinist as a non-construction worker, when it came to the actual coworker model they were categorized correctly as construction workers because the title machinist was also associated with other titles such as a maintenance mechanic.

And for the remaining cases where it's possible that the machinist might have been misclassified it's a very, very low percentage so it likely would not affect any resulting coworker distributions.

And also noted by NIOSH that the misclassification rate, this is the quality assurance they performed after they developed the coworker model and whether the workers were correctly classified as construction trade workers or non-construction

trade workers was less than 5 percent. So it met their quality assurance criteria.

Again, it was determined that would have a minor impact on the co-exposure models in any case.

This is a little bit more that SC&A did about sort of the difficulty in correctly classifying some groups of workers as either construction trade worker or a non-construction trade worker.

And Finding 6 and Observation 6 as you see are sort of --

Mr. Katz: Bob, I'm sorry, let me break in. Someone on the phone line has -- someone has their phone line open and there's a bunch of chatter and it's probably especially difficult for people on the phone to hear what's going on in the room.

So please, everyone on the phone should have your phone muted. If you don't have a mute button for your phone press *6 on your phone and that will mute your phone for this conference line. But please don't have an open line with discussion. Thanks. Go ahead, Bob.

Mr. Barton: Again, this is about sort of the difficulty in classifying workers as either construction worker or non-construction worker.

And as Tim indicated, and what we're really talking about is the non-routinely exposed worker versus the routinely exposed worker.

I'm not saying that they're non-routinely exposed. It's that their exposure potential is not of a routine nature. They're doing different jobs. They're breaking down glove boxes. They're doing modification, that sort of thing, versus a routinely exposed worker who might work at the same glove box for their entire career. And there are more permanent sort of engineering controls and such associated with that.

So what we did, and this is the subject of Finding 6 and again, Observation 6 on the next slide.

Targeted sampling compared the OTIB-0081 strata designation -- again, that's CTW or non-CTW -- against two alternate sources for identifying worker job classification.

And it indicated that just over 9 percent of those entries appeared to be in conflict when you compared the NIOSH designation in OTIB-0081 and what SC&A did with these two alternate sources of information.

Now, just a note on that 9 percent. Again, this was a very targeted sampling. We looked specifically at job titles that might pose a problem with determining whether they should be included in the construction trade worker or non-construction trade worker.

Examples would be the job category such as foreman. Was the foreman in an office most of the day and would periodically visit his crew out in the field doing the actual radiological work? Were they up in the gallery just observing the work from sort of a distance?

Or were they actually hands on with a small crew down there doing the exact same work? It's difficult to tell unless you really get down into the case.

Another example was the assistant or helper category. If your job title is simply given as an assistant, well, were you a laboratory assistant where your exposure could be considered more of a routine nature, or were you a carpenter's assistant out there doing the non-routine construction type job work.

And the last one we really took a hard look at was a job title known as the general service operator.

Operator obviously is going to be considered with a more routine exposure category, but what we found

was that the general service operator sometimes was more akin to a laborer or a truck driver, something that would be considered construction trade worker rather than a non-construction trade worker.

So this targeted sampling really looked at those jobs which could be considered in a gray area.

And so that 9 percent really just reflects a subset of the entire worker population. This 9 percent does not reflect the entire co-exposure population.

And so the Work Group discussed that issue and decided not to pursue a sensitivity analysis which this will make more sense when we get to Observation 6 on the next slide so let me just head there.

Observation 6 reads SC&A acknowledges that there are inherent difficulties in correctly associating individual workers with the correct CTW/non-CTW strata.

This is particularly true for job titles that could potentially be included in either strata.

SC&A suggests a scoping analysis in which the borderline job titles are removed to ascertain the effect on the resulting distributions.

Such an analysis would help determine whether current strata designations are sufficient, or a more rigorous approach to individual job classification is warranted.

After lengthy discussion similar to the finding regarding the extra claims that have been filed since the coworker model essentially cut off back in 2011 it's really the amount of resources that would have to be expended for such an analysis really outweighs the potential benefit.

And again, we were looking at a very small subset of the population so it's not clear that it would really

even have a discernible effect on the resulting distributions.

Observation 7, and this is the last one. This has to do with the quality assurance assessment that NIOSH performed on their own dataset.

Again, going in and pulling random samples, predetermined set of random samples to see if they hit either the 5 percent criteria for what's called a non-critical field, or 1 percent criteria for critical fields. Critical fields are obviously going to be the actual sample result and things of that nature.

And observation 7 reads the results shown in Attachment A -- that's where the quality assurance assessment was detailed -- demonstrate a high degree of confidence that the acceptable error rates are within the goals established for each test.

However, this conclusion is dependent on the assumption that payroll ID issues identified would not affect the resulting coworker distribution.

Now that last sentence, the payroll ID issues. Essentially payroll ID was often used as a way to identify who was a construction worker and who was a non-construction worker.

And I believe, and I don't want to botch this so Tim interrupt me if I'm wrong, but I believe what came out of that discussion is that through this quality assurance assessment NIOSH was able to actually identify what was a systemic problem with one particular format in these payroll IDs.

And so the QA assessment uncovered that. And once it was figured out that that might have been a systemic problem all of those affected results were targeted and corrected. That's basically what it was. And so that observation was closed.

So that ends my summary of the SC&A review of OTIB-0081.

Dr. Taulbee: We would be happy to answer any questions on OTIB-0081 now.

Mr. Katz: Thanks, Tim. Thanks, Bob. Very nice summary. Very long day of discussions. Go ahead, Jim.

Member Lockey: Bob, I'd make one suggestion on that SC&A Finding 6, the finding and the conclusion.

I understand what you meant there, but a year from now if somebody goes back and pulls this out and looks at it it's not going to be clear, 9 percent versus 5 percent.

So maybe you can put some clarification in that for the record.

Mr. Barton: Sure, absolutely.

Member Lockey: What we mean by 9 percent. It was a very targeted population. Okay, thank you.

Mr. Barton: Yes, I agree. That was certainly a source of confusion during Work Group discussions last week so that needs to be clarified.

Member Lockey: That confusion will carry forward as our memory fades.

Mr. Katz: Thanks, Jim. Thanks, Bob. Other questions from Board Members in the room? How about Board Members on the phone?

Member Roessler: This is Gen.

Mr. Katz: Hi Gen.

Member Roessler: Can you hear me okay?

Mr. Katz: Yes, perfectly. Thanks.

Member Roessler: Okay. Since we had the Work Group meetings last week there's been this change in the name of the model from the coworker model to the co-exposure model.

And since SC&A used it or NIOSH used it, SC&A used it I assume that everyone agrees that this is an appropriate change in the title.

Mr. Katz: I think everyone in the NIOSH program folks thought that was actually a great clarification. And SC&A folks I think agreed as well. The Board Members that were involved in the mix there thought that made a lot of sense.

It's such a sensitive issue. It's just one phrase, but it's a phrase that actually resonates for the claimant population too. So as a clarification it seems like a good one.

Member Ziemer: Can I add to that?

Mr. Katz: Yes, Paul, go ahead.

Member Ziemer: Hi Gen, this is Paul. Also, it should be noted that it wasn't really a formal action to change this. I'm not sure it's required.

But I think we all were aware and have been aware for actually years that the claimants frequently, almost always misunderstand what coworker model means.

They believe that it's the dose of somebody they specifically worked with. Another individual from their lab.

We had often gotten comments such as they did my dose reconstruction based on coworker data and I've checked with my coworker and no one ever talked to them about it. So it can't be true.

So the word is certainly misunderstood and we all felt this more generic word was perhaps better.

But I don't think the Board officially adopted new terminology, or if it's even needed.

Dr. Taulbee: I guess I would leave that to the Board as to whether they wanted to formally adopt it.

Mr. Katz: I don't think the Board has to adopt the language itself. That's how the idea was generated, anyway, from that meeting.

Dr. Taulbee: We will certainly start using co-exposure model going forward.

Member Ziemer: As long as it's clear what we're talking about it should be fine.

Member Roessler: Well, I certainly agree it's much of an improvement.

Dr. Taulbee: Thank you.

Mr. Katz: Any other comments from Board Members on the phone? Oh, David, sorry.

Member Richardson: Could you start by describing the situations in which the model will be used?

Dr. Taulbee: Okay. When an individual has or does not have any bioassay data at the site. Let's say that they have no bioassay data and they have external monitoring data.

And so we look at the external monitoring data and it identifies certain areas that they went into.

This would be an application where we could apply the co-exposure model to estimate their internal dose.

Member Richardson: And you had -- so this would be people -- is it only used when there's a complete absence --

Dr. Taulbee: No.

Member Richardson: -- of bioassay. Or is it for any given year of employment where there's an absence? Or how does it work?

Dr. Taulbee: Well, it depends upon the individual's case. I mean, if you look at their bioassay. Let's say they have some bioassay in latter years for let's say

plutonium, for example. And in the earlier years they didn't, but they were in an area that was not -- that had a low potential for plutonium exposure. We might use the coworker model for those initial years, and then use their bioassay for the latter years. But we would be making sure that that bioassay in the latter years was bounded to where we would not be applying this coworker model if those bioassay in those latter years would be showing positive. So we would be using some variation between the two, but we would always use the worker's bioassay as the primary source for dose reconstruction.

If you were to invert those to where they had bioassay in the early years we would use that data. And then in the latter years where they didn't, and say they were in an area that required monitoring once every three years and they left after two years we would apply this co-exposure model for those last two years.

Member Richardson: One of the radionuclides that's on the list for co-exposure modeling is tritium. Could you discuss that because that's been problematic at SRS?

Dr. Taulbee: Okay. Give me a little bit more about what you're referring to as problematic.

Member Richardson: There are years -- if my recollection is correct there are years in which the external dosimetry record has the tritium component summed into it. And there are years where it does not. So one can't partition out the component of dose which is from the tritium intake I would think. So is it viewed then as the assumption is it's all external? How does that work?

Dr. Taulbee: In the cases where -- it actually doesn't really matter from that standpoint because we have the tritium bioassay. We use that to estimate that worker's dose. Whether they included it in the external or whether they didn't doesn't really matter. We will use that person's tritium

dose.

And what you're talking about is where it was a record-keeping scenario at the site where they took that bioassay, converted it to dose and added it to the external dose. In this case we have both the external dose and we have the tritium bioassay. We will do the dose calculation based upon the tritium bioassay regardless whether it made it into that final external dose or not. We will calculate their tritium dose based upon their bioassay. We get those results for every worker. Or not every worker, but every worker who left tritium samples. We get their individual bioassay.

Member Richardson: And then do you subtract it out from the external dosimetry record?

Dr. Taulbee: I would have to look at the Technical Basis Document to see. I don't know if there's certain years that we subtract it out and certain years when we can't determine and we just assume that this is all external dose and then add on an additional --

Member Richardson: Yes, I guess that's what I was asking.

Dr. Taulbee: That's how I believe we handle it. But again we get the individual tritium bioassay dose.

Member Richardson: And for the SC&A, one of the things that you had noted was you have a couple of open questions. One of them was this puzzle about the bioassay variability and what's causing parallel analyses of the same urine sample to give different results.

Another one was could you describe -- you had a question about the use of multiple imputation for values that are less than one-half of the MDA.

Mr. Barton: Yes. Multiple imputation, like I said it's been used for external coworker modeling in the past. This is the first time that it's been used for any

sort of internal coworker modeling. And that is -- RPRT-0096 really describes that new method for internal coworker modeling.Now, what we noticed is as it was applied in this case often, for example, say for plutonium or something like that the multiple imputation method results in 50th percentile estimates of the bioassay value that are much less than one-half of the detection limit, of the censoring level.

So in other words let's just say for example you had a result that was less than one and that result was an individual's. That individual would be assigned a missed dose based on half that value assigned a triangular distribution. The imputation method takes that less than one and imputes a different value essentially and that goes into the coworker distribution. And what we noticed is that the end result after the imputation method is you could have coworker bioassay assignments that again are part of a distribution.

We're not assigning an individual imputed value, but you could have coworker values at the 50th percentile that are 10 percent of the censoring level, or even sometimes a little bit less than that.

Member Richardson: And over a large number -- because it's a lognormal distribution, and over large numbers of imputations the expectation of the value below the detection limit is -- it's the detection limit over the square root of two, isn't it?

So I believe that it would be -- it would not equal the detection limit divided by two. It would be the detection limit over the square root of two. So divided by 1.4. I think that's how that works.

Mr. Barton: I'm really not sure. Again, the -- what gave us the greatest concern was seeing coworker values that were so much less than one-half. And that's what drove us to do some of these scoping calculations.

Member Richardson: I would think that it would be -

- that you would get -- it should drive to something. You probably played with us.

Dr. Taulbee: Yes, and this is where SC&A has the action to review RPRT-0096 which actually looks at several datasets where we artificially create a censoring value and then do a comparison of the multiple imputation method with the real values within those datasets. And that's what SC&A is currently tasked to look at.

Just a bit of clarification from what Bob was saying. This is the first time this method has been used in coworker models. That is a true statement. This is the first time we've done a coworker model in this particular method and going through all of these steps of data verification and completeness and so forth. So this is how we're proposing to go forward. But again SC&A has the task to look at RPRT-0096.

Member Richardson: Okay, thank you.

Mr. Katz: Any other questions for Tim and Bob? Okay, then. We have actually -- Tim, do you want to say something?

Dr. Taulbee: Yes. RPRT-0092 now.

Mr. Katz: I don't know where we want to divide this in terms of the coworker model action versus --

Dr. Taulbee: Oh, okay. I'm sorry. Go ahead.

Mr. Katz: Okay, thank you. So we have two Work Groups that both voted in support of making the co-exposure criteria guidelines final so that NIOSH could go forward with not just here, but coworker -- co-exposure modeling for other sites as well.

So, as with all cases with a Work Group motion it doesn't need a second. It's there. We've had I think all the discussion that there will be unless any of you want to discuss the fact that -- of moving forward on this and putting it to bed. I don't see anybody looking for that. So we can take a vote if

you're ready for that. Dave?

Member Kotelchuck: Please be clear, what are we voting on?

Mr. Katz: So, what we would be voting is to agree that the co- as we want to call it now - co-exposure criteria for modeling --

Member Kotelchuck: Jim Neton's.

Mr. Katz: Yes. Are made final and put into effect across the board. Clear, everyone?

Member Anderson: This is Andy. What our Committee looked at is kind of the 30,000 foot level of criteria that were set out, were they sufficiently comprehensive, did they cover all the areas that would need to be looked at when developing a co-exposure model as opposed to what you really heard in the last two hours is the application of those criteria to the Savannah River Site and the development of a co-exposure model.

Our Committee really didn't look at decisions that NIOSH made, were they appropriate, was the data adequate through the whole time, all of that. It was just were there other areas that were missed, could it be done.

And that's really what we're asking is we just couldn't identify any areas that would need to be worked on. Mostly it's a decision from the various Work Groups on site-specific things is we didn't really talk anything here much about stratification other than the construction and worker, non-construction worker kind of things.

But the issue of is that lumping everybody together and using all the data, is that an appropriate and is there adequate data for all the years, trying to fill in. That's really a site-specific set of discussions that our group really haven't been involved with at the Savannah River Site.

It was a very data rich site compared to others so a lot of the criteria about having 30 workers or whatever really wasn't an issue. So that's really what we're looking at is when you look over that set of criteria is there something missing, is there something that's not adequately spelled out.

We're not looking at has it been appropriately interpreted because that's always open to discussion and that I think is where the Savannah River study group is looking at a number of these issues.

So, we really felt that it's -- this set of criteria has been around since 2012 I think if not earlier. And drafts for so long and it really has not been altered. And we didn't think -- come up with anything that we thought ought to be changed in it or added to it. So that's what we're basically saying, trying to take the draft off it, make it a formal set of criteria.

And the only change that we're supportive of really is changing -- not calling it coworker, calling it co-exposure because really that's what it's set out to do is looking at exposures doesn't matter so much what the job title was if we believe the people had the same exposure, were working in the same environment as other workers.

Mr. Katz: Thank you, Andy. Thanks for that elaboration.

Member Anderson: We're not suggesting that you were -- at this time we're adopting what Tim presented as the way forward for Savannah River. That's really up to the Savannah River group to decide and come back to the Board.

Mr. Katz: Right. Okay. Do we have other questions about what we're doing here?

Member Ziemer: Would it help for those that weren't involved in the double Work Group meeting to differentiate the action of Andy's Subcommittee versus I think it was Brad's Subcommittee which is

the Savannah River.

I know we took specific action as two different Subcommittees at that meeting. And would it help for someone who has a better memory than I to summarize the two actions? Josie was there.

Member Lockey: I think the co-exposure model, I think we at the Subcommittee level thought it should be finalized and approved.

The appropriate thing is to do that at this meeting today, at least get that off the table from my perspective.

Member Ziemer: And basically the other part was the data adequacy in applying this model to Savannah River Site. And that was also I think is what --

Mr. Katz: Well, there's no motion for action there. There's no action to take there.

Member Ziemer: No, I'm just saying what the Subcommittee.

Mr. Katz: Oh, sure.

Member Ziemer: Well, both Work Groups.

Member Beach: And just a correction, it's a Work Group meeting.

Member Ziemer: They're both Work Groups.

Member Beach: Not Subcommittee.

Member Ziemer: Two Work Groups.

Mr. Katz: So anyway, yes. So the Work Groups have different charges although we did discuss in that meeting, or I did discuss I think it actually was very productive to have the Work Groups together for Savannah River even though again the SEC Issues Work Group, that's not their main charge. It was the guidelines.

It was useful having both because having more perspectives at the table for something as complicated as Savannah River Site is very handy, obviously very handy from the discussion that we had.

It was a fuller discussion by route of those perspectives. So I had suggested that we continue to have joint Work Group meetings to work through the Savannah River issues, even though SRS, I mean the Coworker Model Work Group doesn't have to be there for that.

Member Beach: So we're just doing an action on the criteria --

Mr. Katz: The only action here is to put to bed the criteria.

Member Beach: The coworker -- so it's not going to be a draft. It's actually going to be a coworker criteria.

Mr. Katz: Right. And both Work Groups actually voted on this even though it's really in the domain of the SEC Issues Work Group.

Dr. Taulbee: Yes, I just wanted to echo what Josie just said of making it from a draft criteria to a final criteria so we can start implementing it across the board.

Member Lockey: After 10 years.

Mr. Katz: No, no, 2015.

Dr. Taulbee: We will start implementing it now. It just takes a long time to finalize.

Mr. Katz: Five years. Don't double 5 to 10. Okay. So we're ready for a vote. Dave?

Member Kotelchuck: Well, I'm ready for a vote if you'd like to vote.

Mr. Katz: Okay. I like to vote.

Member Kotelchuck: I have a comment.

Mr. Katz: Oh, a comment first.

Member Kotelchuck: I wish as an example of the application of the coworker criteria that an example was chosen that was a little more simple, a little bit simpler than SRS.

However, we're voting on the criteria and to me those are clear, clear and understandable.

Mr. Katz: Yes. That sentiment, I think others probably hold that sentiment too. Although SRS on the other hand is a very good flogging --

Member Lockey: I second the motion.

Mr. Katz: I was trying to look for what might be missing. It's probably a good one in that respect because it raises so many issues.

Member Lockey: Ted, I'll second the motion.

Mr. Katz: So, let's run down the vote. Anderson?

Member Anderson: Yes.

Mr. Katz: Beach?

Member Beach: Yes.

Mr. Katz: Clawson?

Member Clawson: Yes.

Mr. Katz: Field?

Member Field: Yes.

Mr. Katz: Kotelchuck?

Member Kotelchuck: Yes.

Mr. Katz: Lockey?

Member Lockey: Yes.

Mr. Katz: Richardson?

Member Richardson: Yes.

Mr. Katz: Roessler?

Member Roessler: Yes.

Mr. Katz: Schofield?

Member Schofield: Yes.

Mr. Katz: Valerio?

Member Valerio: Yes.

Mr. Katz: And Ziemer.

Member Ziemer: Yes.

Mr. Katz: All in favor, unanimous, it passes. So that's done. Thank you. It's good to get that behind us. You guys are very unanimous today. That's the last of our votes. Go ahead, Tim.

Dr. Taulbee: Thank you very much. That does help us a great deal to be moving forward with co-exposure models across multiple sites.

Next I want to give a status update on RPRT-0092 which is the evaluation of subcontractor monitoring at the Savannah River Site.

And the first thing I'll say is this is an ongoing discussion between the Work Group, NIOSH as well as SC&A.

To give a little bit of an update of where we are with this particular review is in June of this year we released RPRT-0092 which is the evaluation of bioassay data for subcontracted construction trades workers at the Savannah River Site. This was submitted to the Work Group.

In November, SC&A provided comments to us on this report. Last week, last Thursday and Friday both NIOSH, SC&A and they -- presented our

respective views to the SRS and SEC Issues Work Groups.

Currently NIOSH is working to provide responses to SC&A's comments with regards to that report, RPRT-0092. We received a number of comments from SC&A and we are working through those to address each of them and then we will be meeting again on that particular issue.

Some of the major topics still needing further discussion to resolve will be the stratification issue that was pointed out earlier of non-construction trades workers, DuPont construction trades workers, subcontractor construction trades workers.

In June of this year we also submitted a White Paper entitled Savannah River Site Plutonium Construction Trades Worker Stratification Refinement.

And also in November SC&A provided comments on that White Paper. And we are going to be providing responses to them in early 2020.

And at that time I think it's appropriate for the Work Groups to obviously get back together and we will go through and discuss those -- that White Paper and SC&A's comments and our responses to them much like we did with the coworker model.

There's another report, Americium Monitoring at the Savannah River Site that we released in June of this year. This would be RPRT-0091, Evaluation of Savannah River Site Americium-241 Source Terms Between 1971 and 1999 Using Bioassay Frequency Tables. And SC&A is to provide comments on this particular report as well.

So those are some of the major topics that we have ongoing within these Work Groups, particularly the Savannah River Site Work Group, but the SEC Issues Work Group certainly are interested in their views of the stratification issue as well.

So that's a very short abbreviated update of where we are with Savannah River from the subcontractor construction trades worker evaluations.

All these reports are out on the web so if you want to read RPRT-0092 or RPRT-0091 they are out there. I will warn you they're a little lengthy. I think RPRT-0092 is about 181 pages. So it's an in-depth analysis and SC&A's comments I think is about 70 pages. So it's some good light reading for everyone.

With that I'll be happy to answer any questions.

Member Beach: You might have just talked too fast there.

Mr. Katz: What's that? He stopped too fast?

Dr. Taulbee: I talked too fast.

Mr. Katz: Oh, talked too fast. Do we have any questions in the room? How about on the phone? Do I have any questions from Board Members on the phone? Joe, anything you want to say? Okay.

All right. We're at 4 o'clock and we have till 4:30. I had explained to petitioner/folks who represent folks at Savannah River Site that they could comment during the public comment session.

However, because I didn't know whether we would have time during this session for them to comment.

We do have a half an hour though. And I don't know whether they're on the line and listening right now, but if they are and they would prefer to comment now instead of the public comment session that's most welcome.

If they'd rather wait till the public comment session or they can't hear me then that would happen anyway, that's fine too.

But do I have anyone from -- representing folks from Savannah River on the line who might want to say some words?

Mr. Ringen: Knut Ringen, I'm speaking on behalf of the building trades.

Mr. Katz: Knut, I don't know if you're using a speaker phone, but your voice is cutting out.

Mr. Ringen: Let me try something different. Is that better?

Mr. Katz: Give it a little try, let's see.

Mr. Ringen: Okay. How does that sound?

Mr. Katz: I think that's good. Thank you.

Mr. Ringen: Okay. I just wanted to make a couple of comments both about the coworker modeling and also about whether it can be applied to Savannah River in the way that NIOSH has proposed.

And I mentioned some of this when the Work Group meetings took place.

And I continue to ask this Board and I'd like to ask you again to determine what you mean by sufficient accuracy.

Because until you can do that then you really have no way of saying whether these models are valid or not.

There's no doubt there will be a significant number of workers who should get compensation who will not get compensation if you apply a coworker model.

How many that is is very hard to say. Is it 5 percent of all workers, 15 percent, I don't know.

But I do know this for sure. If you don't do stratification within these cohorts there is no way that you can accurately determine who's going to get compensation and not get compensation the fair way.

I don't see how you can do that without

stratification. And I just want to make that point very emphatically.

I also want to make the point that NIOSH is increasingly moving towards imputation of data which is a very tricky thing.

It's obviously the statistics of last resort that you need to use. And it involves applying a huge amount of assumptions that may or may not be expressed correctly and may or may not be valid. That's certainly very hard for anybody who's not involved to confirm or validate.

I also want to warn about the excess use of the work permit to establish whether somebody was onsite, or whether somebody could have had --

(Simultaneous speaking.)

Mr. Katz: I don't know what happened. Try again.

Mr. Ringen: That happens frequently, Ted. Sorry.

Mr. Katz: Go ahead. Go ahead.

Mr. Ringen: I want to warn about the excessive use --

Mr. Katz: The further you're getting away from your mic, but it's happening again. We can't hear you.

Mr. Ringen: I tell you what. I'll send some comments in writing.

Mr. Katz: We can't hear you. I don't know.

Member Anderson: We can hear him on the phone.

Mr. Katz: You can hear him. That doesn't help us in the room.

Mr. Ringen: Can you hear me now?

Member Clawson: You're clear to us, Knut, it's just that everybody in the room can't hear you. It's what we've been suffering with all day.

Mr. Ringen: Okay.

Mr. Katz: Something must be going on on our side here.

Mr. Ringen: I think it's your problem.

Mr. Katz: Hold on.

Mr. Ringen: That is frequently the case.

Mr. Katz: Okay, why don't you try now again, Knut.

Mr. Ringen: How does that help?

Mr. Katz: You were way better when we started. I don't know what happened.

Mr. Ringen: But now I can't remember what I said.

Member Clawson: You were talking about the data and the use of it.

Mr. Ringen: I was kidding. I was kidding. Sorry.

(Simultaneous speaking.)

Mr. Katz: -- just keep talking randomly until we'll see if we can hear you.

Mr. Ringen: I don't want to waste anybody's time.

Mr. Katz: Knut, that's better right now. If the phone -- you can hold it where you have it that might work. Try again, Knut.

Mr. Ringen: Let me just very quickly, the points.

The Board and NIOSH has not defined what it means by sufficient accuracy. That's the first point. And until you do that you cannot really know whether what comes out of this modeling is going to be adequate.

The second point that I made is that I don't see how you can do co-exposure modeling without stratifying these populations because they're so

heterogeneous. And I warn very much about jumping to conclusions that maybe you can do this without stratification.

The third thing that I want to warn about is the increasing use and reliance by NIOSH on imputation.

As you know, in statistics that's a measure of last resort and it involves establishment of a huge amount of assumptions that are very hard for anybody who's not directly involved in the modeling to establish whether these things are going to be valid or not.

The fourth point I want to make is that NIOSH is also increasingly relying on work permits, whether site permits or job-specific permits to establish whether somebody has been at work in a particular location, task, or whatnot, and whether they could have had radiological exposures as a result of that.

I would not rely very much on work permits because they are very inaccurate. We know for sure frequently that construction workers worked outside their permits, are linked to other contractors for something or another.

And a variety of other things that workers have told NIOSH about down there.

I noticed in one of the slides that NIOSH presented, slide 53 in one of the presentations they reported that 7 out of 136 construction trade workers in a particular work permit were laborers.

That means that less than 5 percent of all construction trade workers in this particular job were laborers. That's inconceivable. That would be like having an operating room with only surgeons and no assistants.

In any work crew of construction trade workers the laborers constitute between 20 and 30 percent. So how one can say that a crew with 5 percent of

laborers is indicative or representative of anything suggests to me that whoever decided also doesn't know very much about construction workers.

Based on all of these things together I think it's very unfortunate that NIOSH has spent so much time on doing all of this, particularly for the Savannah River workers.

I'm calling you now because the lead petitioner is dead. The two other petitioners are not capacity worthy or willing to participate in this.

The lawyer for the workers is in hospice and is no longer able to represent them, Bob Warren.

And all of this is a result of a period of 10 years of churning and churning data with very little gain to be shown for it. And it's incredibly unfair to the workers at Savannah River.

Moreover in general the co-exposure modeling that is being proposed is going to be unfair to somebody and we don't know who that is, and we don't know how many it is, or how significant that is, or whether that exceeds whatever looks to be significant in NIOSH's eyes at any given time.

But one thing is for sure, it's not going to be fair. Thank you.

Mr. Katz: Thank you, Knut. Knut, if -- if you have thumbnail notes of what you just said it might be helpful for the court reporter. If you don't mind. You could email that to me, or you could email that to the program and they'll send it to me. Whatever.

Mr. Ringen: I will, Ted.

Mr. Katz: Thank you so much, Knut.

Mr. Ringen: Sure.

Mr. Katz: Thanks, Paul, for that suggestion. Okay, very good. Do I have anyone else from the site on the phone who wants to say anything? All right

then.

Our next session is -- well, we have a break between this and our next session, and the next session has to wait anyway because it's the update on Lawrence Berkeley. We don't want those people if they were expecting to call in for that to call in at the wrong time.

So we are on break and that break ends at 5 p.m. local time. So please be here at 5 p.m. for Lawrence Berkeley update.

(Whereupon, the above-entitled matter went off the record at 4:08 p.m. and resumed at 5:00 p.m.)

Mr. Katz: Let me check on the line to see if I have my Board Members on the line. Brad, are you there?

Member Clawson: I'm on, Ted.

Mr. Katz: Thanks. Gen, you there?

Member Roessler: I'm here.

Mr. Katz: Great. You guys are loud and clear right now, at the end of the day. How about Phil, are you on there? Phil?

(No response.)

Mr. Katz: And how about Andy, Henry Anderson?

Member Anderson: Here.

Update on Lawrence Berkeley National Laboratory Site Profile Review

Mr. Katz: Okay, great. Okay, so we might be missing Phil for the moment. And in the room we have all our Board Members, but for David Richardson's gone and Bill Field I think is somewhere. He's not in the room right now. But why don't we get started I think.

David is gone. Bill, I don't know where Bill is. He's

missing. Oh, Bill's conflicted. He's not conflicted for this session because this session is just informational, but it's okay that he's not in the room. It's fine. He can't be active with this Work Group.

But otherwise the slides are up and Paul, I think if you're ready, we're ready.

Member Ziemer: Okay. I was sort of hoping there might even be some Berkeley folks in the room. So we'll be speaking to the choir as it were, Megan.

I'm like many old guys. I have to start with a story which is not in the slides. But I want to tell you the extent to which the Lawrence Berkeley National Lab impacted on me going way back.

In the mid-'50s when the Health Physics Society started -- and this is before I was around, by the way -- but the national meetings of the Health Physics Society were held in universities, not in hotels during the early years. The first one was held in 1955 at Ohio State University and the second one in '56 at the University of Michigan, the third one in '57 at University of Pittsburgh. And the fourth one was held in 1958 at the University of California Berkeley.

Now, the other thing that was going on in 1958 is that I had just received an Atomic Energy Commission fellowship which included a summer internship at the Oak Ridge National Laboratory, summer of '58. The contract for the fellows on the program, and there were 30 of them at Oak Ridge at the time, 30 young mostly whippersnappers who were taking their courses at Vanderbilt and their internship at Oak Ridge. And the program was administered for the Atomic Energy Commission by what was then called the Oak Ridge Institute of Nuclear Studies, now ORAU.

It turned out for some odd reason Oak Ridge Institute of Nuclear Studies had extra funds that they needed to spend on the fellowship program.

And they decided that all 30 fellows should come to Berkeley for the annual meeting of the Health Physics Society. So they flew 30 of us out from Oak Ridge to Berkeley for that meeting. That was my first professional contact with the larger health physics community. And it was exciting to be part of that.

It was not realized by me at the time, but two years later, I would be at Purdue University working on my Ph.D. and it turns out that my mentor, my major professor John Christian had started a program involving the use of radio tracers, a program whose techniques he had perfected as it were by coming to Lawrence Berkeley and working with a group from the cyclotron group including Ernest Lawrence and his colleagues who had started to make radioisotopes for medical research purposes.

So John Christian learned his techniques from Ernest Lawrence, brought them back to Purdue and started the radioisotope program there which required them to bring in a health physicist which is how I got there.

So Berkeley has double-kicked my career into existence.

And it seems not ironic, but at least curious that here we are as chairing the Berkeley Work Group. I'm pleased to have that opportunity.

I'm mainly going to introduce the person who's really going to talk about Lawrence Berkeley, but let me just give a couple of pieces of background information.

And this magic button doesn't work very well, this up button, the down button. How about left or right? Here we go, how's this? Press enough buttons and something works.

Just to tell you who the Work Group Members are: Brad Clawson, David Richardson and I'm serving as

Chair. So, a small Work Group.

So here's what has gone on and you'll get more details in a moment, but activities relating to the laboratory.

There have been mass record requests. Records retrievals have been carried out by NIOSH. There's been interviews with some of the past workers, particularly the health physics group, radiation safety employees.

There's been extensive Site Profile reviews by the Board's contractor, SC&A. And we've had several Work Group meetings. I'll just enumerate them because there hasn't been a lot. Most of what's gone on has been retrieval of data and preparation of Site Profile-related documents.

Our first meeting was in 2012 as indicated on the slide, February 3. We met again in April of 2019 and again just a few weeks ago in November of 2019.

The Site Profile goes back to August 2006, at least what I'll call the initial Site Profile or Rev 0. But during the internal review of its own document, internal review by NIOSH they made changes. So Rev 1 came out very shortly thereafter in April of 2007. There now is a Rev 2 which was issued in May of 2010. That really occurred because of the review that NIOSH was doing related to the initial SEC petition for this site. So in doing the -- gathering the information for the SEC review a number of changes were made in the Site Profile itself. So Rev 2 is the one that's basically in effect now. And although SC&A began their review of the Site Profile prior to Rev 2 most of what we have today relates to Rev 2 issues.

I also put a note on this slide that NIOSH recommended an SEC for the lab for the period of August 13, 1942 to the December 31, 1961 era. And that was approved by this Board in March of 2010. So there is an SEC for those early years.

Currently there are 21 issues that have been identified by our contractor SC&A. By issues we're talking about -- that's a broad name for both findings and observations.

There are 13 findings and 8 observations. And in working through some of those findings, additional findings have arisen on specific issues. You'll learn of those in a few moments.

So let me now introduce Dr. Megan Lobaugh of NIOSH. She is going to give you a lot of information about the findings and where they stand as well as the observations.

Megan, we're pleased to have you do this. She's done a terrific job of putting together all that has happened before. So we're pleased to have her make the presentation. And I'm glad not to have to tell any more stories.

Dr. Lobaugh: Thank you, Dr. Ziemer. So before we get into the Site Profile issues, I'll talk a little bit about the site too just to give kind of a background on the type of work that they do.

So, just a quick overview of what I'm going to talk about. The site itself, then I'll go through a summary of the Site Profile issues and I'll talk more specifically about the issues that are in progress. So I won't touch on the ones that are currently closed.

Then I'll do an overview of what we've done recently, so that research and the interviews that we've done. And then I'll speak more specifically on kind of our most recent focus which is a White Paper that we issued in 2017 called the Method to Assess Internal Dose Using Gross Alpha, Beta and Gamma Bioassay and Air Sampling at Lawrence Berkeley National Lab.

And this document as Dr. Ziemer said, kind of came out of the review of the Site Profile. So it's kind of been one of those issues that came out of reviewing other issues.

So just first a little bit about the lab. It was founded by E.O. Lawrence in 1931 as the radiation lab. You'll see that the covered period really doesn't start till '42. That's because in '42 is when they actually received their contract with the AEC at the time. Well, really Manhattan Project before that.

So the EEOICPA covered period really starts August 13, 1942 and it goes through present because this lab is still currently working as some of us saw yesterday.

It's a multi-program science lab. So that means they do pretty much everything under the sun when it comes to basic research.

Some of the facilities are things that you may have heard of, are the 88-inch cyclotron. This is one of the big user facilities onsite.

There's also the advanced light source, the molecular foundry, biosciences, and then in particular one of the facilities we saw, the biomedical isotope facility. And kind of along the lines of what Dr. Ziemer was talking about in his story.

There is also the DOE Joint Genome Institute and then research, just other research on energy and environment.

I think this is a pretty cool site and a lot of us were impressed by the number of awards that the scientists have received. And in particular there's 13 Nobel Prizes that have been awarded to scientists that have worked at Berkeley.

On the right-hand side here I have a map. I thought maybe it would be kind of helpful to point out like where we are in relation to it.

So the lab itself is up the hill from the city of Berkeley, from the campus of UC Berkeley. But then we're I think down here right by the airport. So I don't know if you can see my mouse or not. I

probably can't make a pointer out of it.

But we're not far from it at all. It took us about 35 minutes to get there the other day.

So more specifics on LBNL and Part B. So, as Dr. Ziemer said, there's been a Special Exposure Cohort Class that's been added and it's all employees from that start of the covered period, August 13, 1942 through December 31, 1961. And the time period is based on two different infeasibilities. So external dose we have an infeasibility prior to 1948 and internal dose prior to 1962.

For just number of claims that we've had there's been 217 completed claims. Of those 43 had a PoC of greater than 50 percent and 174 had a PoC less than 50 percent. PoC being Probability of Causation.

There are currently -- or at the time I made this presentation there were currently 8 active dose reconstruction claims and 36 pooled. The pooled could be pooled by DOL for some reason or for the SEC.

So now I'm going to go into the Site Profile issues. As Dr. Ziemer said, there are 13 findings and 8 observations that we were initially reviewing.

For the findings first, there are three that are currently closed, two that are considered addressed in finding.

Addressed in finding is a status in the Board Review System. That means the issue is completely covered by another issue.

So, basically what happens is our response to the other issue really is going to cover that finding. So I'll talk about those when I go through each of the in-progress findings and how they're related.

And there then are eight in-progress findings.

For the observations we have eight observations. Two of them are closed. Three are considered

addressed in another finding, and three are currently in progress.

So next we'll talk about just those in-progress issues.

So Finding 1 has to do with inadequate documentation of historical operations and sources of radiological exposures.

So this is specific to facility information that we have in our Site Profile really asking for more information broken down by facility and by time period.

There's a related issue, so Observation 5 is addressed by Finding 1. And Observation 5 is entitled Lack of Information on Isotopes, Facilities and Handling Methods. So again just requesting additional facility information.

So the last thing I'm going to talk about with each of these findings is the action items. What's left to do or what's currently on the plate.

So for this one NIOSH needs to update the Site Profile with additional information that has been captured since the last revision of the TBD.

So we're in the process of still capturing information. So that's why this finding remains open or in progress.

Next is Finding 2 and it's on insufficient information for internal dose, especially during the early years.

So this was kind of a focus area of the SEC Class, but we found even after the Class was added for that prior-to-1962 time period that there really is still some more information that we need to talk about even post 1962.

So again it's focusing specifically on internal dose. And we have two related issues, or two issues that are addressed by this finding and that's Finding 4 which is bioassay data, completeness and adequacy

not verified, and Finding 11, inadequacy of bioassay analyses presentation. So just really about how we're talking about the bioassay analyses.

So for this again NIOSH has the action item and we currently need to respond to the SC&A February 2014 memo with more specific references to where we have provided the information that they're requesting as well as how this internal dose methodology White Paper I mentioned before, how that will really affect the answers, or the questions that they're asking.

So, currently this is one of the findings that we're targeting in our most recent interviews and the data capture that will be upcoming. I'll talk more about that later.

Finding 5 is -- so you'll see I skipped a few findings there. We went from Finding 2 to Finding 5 because Finding 3 I believe is closed and Finding 4 was addressed in the other finding.

So Finding 5 is insufficient justification for selection of IREP energy range fractions for photon exposures. This is specific to external dose.

And again we have a related issue. So Observation 8 is addressed by this finding. And Observation 8 is with regards to the overuse of generalizations and assumptions. And the specific area within Observation 8 that appears to be too general would be the IREP photon energy fractions. So that's why that is addressed by this finding.

So the action items that we have are to update Table 6-5 in the TBD for all years and all major accelerator operations.

And again this is something we're targeting with our data capture and current interviews.

Finding 6 is insufficiency of neutron dosimetry treatment again focusing on external dose. And again the same related issue as prior. Observation 8

is addressed by this finding. And the specific area would really be the neutron-to-gamma ratios.

You'll see that NIOSH has a lot of action items.

For this one we will revise the external dose discussion to direct the use of the neutron-to-photon ratios.

So one of the questions that came up with this finding was we have a neutron-to-photon ratio, but we don't explicitly say to use it during certain time periods.

So really be a bit more explicit in the TBD about that.

And then one thing that we're currently really investigating is NTA correction factors for energy response, angular dependence and fading.

Again, something that we just need to clarify in the TBD is that the discussion around the low-energy NTA correction factors and uncertainties that are listed in Table 6-11.

Finding 7 is a failure to justify the shallow dose to deep dose assumption. Again focusing on external dose.

And here we have three related issues. So Observation 5 is a lack of information on isotopes, facilities and handling methods.

Here specifically what will be covered by this finding is the additional information specific to shallow and extremity doses.

Observation 6 focuses specifically on extremity dosimetry and the need to provide more information there.

And Observation 8 specifically will cover the shallow to deep dose ratios by this finding.

Here we have a long list of action items. We're

planning to review the NOCTS claim data to determine if the claim data that we have supports the shallow to deep dose ratios and extremity dose ratios that are in the TBD.

We're going to compile a list of the pure beta emitters in use because the pure beta emitters would be ones that are affecting the shallow dose and would not have a deep dose component to actually make any estimate of the shallow dose from.

We're going to research whether there is area monitoring available for those pure beta emitters and determine if an unmonitored approach is needed for those pure beta emitters.

We also need to review the extremity dose ratio and provide some specific responses to SC&A on their comment of our choice of three times, where they're proposing five times.

Again, the interviews and data capture we're doing currently are really going to help us answer these questions.

Finding 8 is on uncertainty in beta gamma dosimeter response to radiation types and energies, again focusing on the external dose.

And our action items here are to update the external dose discussion in the Site Profile with specific direction regarding not using electroscope data. So one of the things that we discuss in the TBD is the use of electroscope data for the time period prior to 1948.

So just again clarifying that, after 1948, we wouldn't use this data because we have other dosimetry data available. We have film and other dosimetry data available for that time period. So electroscope data really isn't the most reliable and shouldn't be used when we have other data available.

We also need to review Attachment A of the Site Profile and provide a summary back to the Work Group and SC&A on what was specifically included to address this finding.

Finding 12 is a failure to provide sufficient guidance for unmonitored workers. And this is a little different than the other ones because we're focusing on internal dose.

It seemed like I was saying external dose a lot there.

So our action items here are really similar to what we talked about for Finding 2 in that we need to respond to the February 2014 memo from SC&A with specific information again on how we can answer their questions, or how we have answered their questions in our previous documentation, and how this most recent methodology that we've put forward would really affect those answers to those questions.

This is the last finding, Finding 13 was inadequate coverage of occupational environmental dose.

So, it focuses on environmental dose. And we need to provide or add information to the Site Profile about the cobalt-60 accelerator and flesh out really accelerator background data, or background exposures for people onsite, and change the guidance for radionuclide assignment for internal dose from beta contributors.

Now, stepping through the observations. Observation 3 is a lack of discussion of radiological incidents.

Really what we need to do here is identify and provide information about any major radiological incidents that we know of at LBNL and incorporate those into the Site Profile.

I should say Observation 1 and 2 are closed. And we actually just closed them at the most recent

Work Group meeting.

Observation 4 is the need to provide information on metallurgical lab. And it's really specific to dosimetry services.

So during a certain time period, the Met Lab provided dosimetry services for LBNL. So we're looking to provide more information in the Site Profile about what those services entailed and additional information about those services.

We kind of discussed in the Work Group that this is going to be hard because Met Lab is an SEC for the entire time period. So it's turned out to be difficult so far to find additional information, but we're still working on that.

Observation 7 is a lack of sufficient information for external dose evaluation. Again focusing on external dose.

Here we've committed to improving the discussion of the post 1947 external dosimetry program.

So this is really just kind of beefing up our section discussing the dosimeter information and the program in general.

Now the fun stuff. So this is what we've been doing recently. As Dr. Ziemer said we've really been focusing on the research efforts and data captures and interviews.

So this is just a quick timeline. I won't go through everything on here. I'll just give you a bit of summary.

But starting over the summer we sent a data request to the site with lots of questions about -- in line with our -- I'll talk about it on the next slide, but in line with our current efforts for the in-progress findings and issues.

Shortly after that we requested interviews through the LBNL point of contact. And then in August we

actually began reaching out to our list of potential interviewees.

Then in September we had two back to back interviews. Those are documented in SRDB with the rough IDs I give above, or give in the presentation.

So, the first interviewee actually provided us several additional names. We sent out requests for additional interviews and didn't hear back.

So there is still potential that we could have additional interviews, but it's a little bit removed from when we made that request so we're not really waiting on that.

Then the site in November actually provided us with some selected technical documents that we requested. So they're numbered documents, or UCRL-numbered. So we actually were able to ask for some specific documents there and receive them.

And then in January we have a data capture scheduled for January 13, the week of January 13.

So what did we specifically request? Specific to the Site Profile issues we asked about whole body counter peak searches and calibration information.

And this covers Findings 2, 4, and 11 which are internal dose findings.

We requested information on neutron and other radiation energy spectra for the cyclotron and accelerators. And this is helping us with Findings 1, 5, 6, and 8.

We requested information on extremity dosimetry. This is helping us with Finding 7, Observations 5, 6, and 8.

Neutron exposures measured by NTA film. And this would be help for Finding 6 and Observation 8.

And then the last one we requested information on

shallow and beta dose.

So we requested this information, but I should also say that we had questions that we ask the interviewees in line with all of these topics as well.

To kind of jump ahead a little bit. So the next topic that I was going to talk about after going through this is the internal dose methodology.

So in that data request we asked about the Site Profile issues that we were following up on, but also internal dose methodology issues that we were following up on.

So you'll learn more about these findings in the next section. But I wanted to point out that the internal dose methodology was really written in response to Site Profile Findings 2, 4, 11, and 12, and Observation 2. And those are the findings that are specific to internal dose.

So the information that we requested was really about their in-house detector systems. So some of the questions that we had from SC&A were about the energy response of the detectors and how we're converting from a count data from a detector to actual air concentration data.

So you'll see that the first two items that we requested are related to Finding 2 and that's because that was really about the efficiency and energy response of those detectors for gross alpha, gross beta, gross gamma bioassay and breathing zone alpha and beta, gamma in-house detector systems.

Then lastly we requested additional information to help us with Finding 1 which is about the representativeness of the air sampling.

So one part of this internal dose methodology has to do with air sampling that was done onsite. And so we were asking more questions -- or asking for more information on policies and procedures and

practices including specific information on breathing zone samples.

So in the tour yesterday we actually saw some examples of their air sampling in picture form because we had to stand outside that lab. We saw some pictures of air sampling in use at LBNL now.

So, the last thing I wanted to talk about was more specifics on this internal dose methodology.

So, like I said this was a White Paper that we put out in 2017, I believe. And it was -- it's a method to help us assess dose from samples that are counted using a gross technique, meaning counting all of the alpha, or all the beta, or all the gamma from the bioassay, or all of the alpha, beta -- or all of the alpha or beta, gamma for air sampling.

So, SC&A reviewed our methodology and issued two findings and three observations.

Currently both findings are still in progress and the three observations, one is closed, one is in abeyance and one is in progress. And I'll actually go through all of these observations because this has kind of been the focus -- the biggest focus of our most recent work.

So finding 1 as I mentioned before is about the air samples may not represent concentrations breathed by the workers.

So, in October 2018 we provided our initial response to the Work Group. And this really focused on why NIOSH believes that, given current day standards for breathing zone samples and the LBNL policies and documentation that are available, why these samples that we used in the methodology we consider representative of the air concentration.

Then in April 2019 we had a Work Group meeting and we discussed the issue. And at that meeting additional information was requested such as air flow studies, pictures documenting placement of the

air samplers and more information really relating to the implementation of these policies.

So this is one of the things that we were targeting in our interviews and data capture. So really we asked questions and made a request for additional information on the air sampling programs' policies and procedures as well as in the interviews asking questions about the implementation itself.

So Finding 2 is as I mentioned before has to do with the technical issues and uncertainties with the gross counting data conversion from basically counts to an air concentration which is then used for an intake calculation to use for internal dose reconstruction.

So in October 2018 we provided a response committing to research and review the detector technical information, basically the efficiency calibrations for the detectors to determine if for specific radionuclides we may be underestimating using these gross measurement methods.

Again we targeted interviews and data capture for this to ask for more specific information on in-house detector systems or for people we can talk to who maybe worked with the systems and could give us more information.

So again this is in progress and we hope to capture some information in January.

So now onto observations. Observation 1 is about potentially missed radionuclides.

So SC&A provided a list of several radionuclides that were not included in the initial methodology. So here I'll just go through our response for each of the radionuclides.

So one of the things they mentioned was radioiodines. And these were not included because they would not have been measured by these samples. They were actually measured by separate charcoal samples onsite.

During the Work Group meeting we were asked to provide additional information on the radioiodine sampling and if we see a need for providing a separate methodology for radioiodines for unmonitored workers.

So we have committed to provide a written response on that.

One of the other radionuclides was erbium-165. This was not included because it's below the short half-life cut-off that we used for this document.

Again this was something that was discussed in the most recent Work Group meeting and we've committed to provide a written response on this short half-life cut-off and what it's for, why we did it. We provided some information in the methodology so I think this document would just be to clarify that and provide the information again.

The next one is erbium-169. This was something that just got left off the list. So it will be added to the final DR methodology implementation.

The next one is fermium-237. And we believe that this is a typo in the SC&A methodology review. And we think that the intent was likely fermium-257 which is in the Site Profile but not included in our methodology.

So fermium-257 will be added to the final DR methodology implementation.

LBNL is kind of an interesting site because they're one of the sites that actually creates new radionuclides.

So some of our discussions in the past were well, how do we know for sure it's a typo and not a radionuclide none of us have heard of, right.

So it took some research to kind of pull the string a little bit on this one and another one of the radionuclides.

So the next one is rhodium-102. And again this was inadvertently left out and will be added to the final implementation.

Scandium-93 is one of those interesting ones where we believe it was a typo. And we actually found where the typo came from. We believe it's a typo in the site environmental reports.

So we're still confirming with the site themselves to make sure that, again, this isn't something that we just don't know about.

But we definitely were able to track it back to how it got into our TBD through the site environmental reports. So we'll be reporting back on that one.

So this is observation that remains in progress.

Observation 2 and 3 are very closely related because they both have to do with information that is in the claimant DOE files.

So Observation 2 is specific to the bioassays in claimant DOE files that may not be indicative of exposure potential.

So what happened was in the methodology we said that bioassay would be an indicator of exposure potential.

And what was found when SC&A did a review of the DOE files was that sometimes it was marked that there would be bioassay, that the person was bioassayed on the form that they complete for NIOSH.

So it's yes, I've included internal dosimetry monitoring, external monitoring. So sometimes it was seen that this form was completed as there was internal dosimetry monitoring, but then it wasn't provided.

I'm going to take a step back. So what happened was that was one way that maybe they saw that it was inconsistent for the site that the DOE files may

not have bioassay data in it.

Well, what happened was SC&A reviewed all claims prior to 2010 and in 2010 actually NIOSH began receiving the entire medical file.

And what we found was that the medical file could have had copies of the bioassay data that weren't transferred over to dosimetry which was providing the dose records.

So in 2010 we actually started receiving the entire medical file for another reason, for actually X-ray information for the occupational medical X-ray dose.

So we received it for a completely different reason, but basically we found that some of this bioassay information was also in there.

So with this observation we actually made a mass re-request of the site to receive the complete medical file for all claims that we received prior to 2010, because like I said since 2010 we've received it.

So this totaled 168 claims that we received prior to 2010 that were not compensated in an SEC or compensated under the dose reconstruction process.

So of these 168 claims, 53 of them had no medical records. These were likely visitors to the site because we made a broad request. It was anybody who had LBNL listed. So they could have been visitors to the site who would likely not have medical records.

There was one claim we inadvertently submitted that actually had a PoC over 50 percent. So that one didn't require any additional review.

Of those remaining claims, 109 of them had no new bioassay information. So everything had already been provided via the DOE request.

There were three claims with new bioassay

information from DOE itself, but we actually had access to it from other documents.

And then there were two claims with new bioassay information.

So because this observation was really specific to our ability to ascribe exposure potential to a claimant, I wanted to take the next step and review really those five claims that had new bioassay information and see how maybe our decision of the application of this methodology could or potentially would have changed.

So for two of the claims that the bioassay results were not available at the time of the DR at all, so there were no bioassay results, there were new bioassay results provided during the re-request. So this is the first row.

So what was the effect as far as the application of the internal dose methodology. It was a definite yes.

For a strict -- so I should say this. A strict application of that exposure potential. So if the only thing we were thinking about was, are bioassay results in the DOE record or in the DOE request that we received back, is that the only thing we're thinking about in terms of exposure potential which I'll talk a little bit later that's not really what we did in our example that we provided the methodology.

So in a strict review of it, yes, those two claims would have been affected.

For the next two claims they actually had bioassay results available at the time of the DR. So the internal dose methodology would have been applied at the time of the DR.

There were new bioassay results available after the mass re-request. So again the potential effect is yes because it could have extended the time that the application of the internal dose methodology was

applied.

Again, it's potential here because the DR-ist could have made the decision that because they had bioassay data they had an exposure potential their entire employment and not just the time of the bioassay results.

For the last claim there were bioassay results at the time of the DR. There was actually no new results provided, only additional details for the results that we already had.

So this would have had no effect on the application of the methodology.

So in the end we had four claims that potentially could have been affected by a strict review of claim information for exposure potential.

So my note here at the top is kind of along the lines of that potential. Again, because the unmonitored approach that we provided in the methodology which uses the air sampling results doesn't necessarily rely on the existence of bioassay data.

So the DR-ist could make the decision to assign the unmonitored approach even if the bioassay results weren't in the file.

So like I said before, 4 of the 168 claims or 2.4 percent could have been potentially affected by the existence of the bioassay data.

This observation was placed in abeyance by the Work Group at our teleconference on the 25th.

And what we're awaiting is a NIOSH update to the methodology to include more clear and explicit guidance on the application.

Because like I said, even though we said that there had to be bioassay data in the files, in our example we actually did not require the use of -- we did not require bioassay samples in order to apply the method.

We would -- what we will include is like what we actually do in practice is review CATI information, other claim information and job title along with the existence of bioassay data to really determine the exposure potential.

Like I said before, Observation 3 is also related to that information in the DOE claim files and is the same but really only focuses on the fact that the files may not be complete.

Again, SC&A reviewed claims that we received prior to 2010 and as I said before in 2010 we began receiving the entire medical file.

So we made this mass re-request not only for Observation 2 but for Observation 3.

But here we look at a different subset of claims when we really think about this. In the end there were really only just those two claims with new bioassay information that we did not have before. So only 1.2 percent of the claims really had any information that we didn't know about.

So this observation was closed by the Work Group at the November 25 teleconference. And I think that's it. I hope I didn't speak too fast.

Mr. Katz: Great. Thank you, Megan. Do I have questions? Jim.

Member Lockey: Thanks for your presentation. How representative were those two claims in relationship to their results when compared to the other data that you had available?

Dr. Lobaugh: What do you mean as far as --

Member Lockey: When they retrieved the bioassay data how did it compare to what was retrieved previously for other claims? Was it in the same ballpark?

Dr. Lobaugh: As far as the order -- like the magnitude of the results?

So I didn't mention this, but actually all of these results, the PoC remained under 50 percent. I don't remember the exact magnitude of those bioassay results, but basically what that means is the new information didn't change the end outcome of the claim as far as the compensation decision goes.

Mr. Katz: Questions from other Board Members? David.

Member Kotelchuck: Back in Finding 7, slide 11.

Mr. Katz: Dave, you'll have to speak into a mike.

Member Kotelchuck: Of course I should.

Mr. Katz: Thanks.

Member Kotelchuck: Sorry. Finding 7, slide 11. There was just one down near the bottom, NIOSH review extremity dose ratio and provide specific response to SC&A comment of three versus five times. Three versus five times, what?

Dr. Lobaugh: So this is specific to the ratio of extremity dose to whole body dose ratios.

And so the three times is what we propose in the -- or what we have in the TBD, and the five times is actually based on from what I remember SC&A said was actual regulations, or you know, what's allowed dose to the extremity versus whole body.

Member Kotelchuck: Okay, good. Thank you.

Dr. Lobaugh: You're welcome.

Mr. Katz: Other questions. Board Members on the line, any questions for Megan?

Member Clawson: No.

Member Kotelchuck: If I may.

Mr. Katz: Yes, of course.

Member Kotelchuck: One more comment. That was

a very nice clear report. Thank you.

Dr. Lobaugh: You're welcome.

Mr. Katz: Yes, I agree, I agree.

Dr. Lobaugh: Thank you.

Member Beach: One of the best I've seen for a while.

Mr. Katz: Oh wow. That's good. We need a competitive spirit among the NIOSH staff about these presentations. Brad? Okay, then. That concludes the session.

And I can see from the room that we don't have any folks from the lab here in the room.

But let me just check because I know people don't get in their car around here. Traffic is difficult especially at this hour. And check on the line and see if we have any folks from the lab on the phone.

Because if we do we'd want to hear from them first. Okay, not hearing from them I don't have the sign-up sheet for people who want to comment but I only notice one person who might have comments for the Board in the room.

I'm sure she did sign, I'm sure she did. I just don't have the sheet. But I don't need it either.

So you're welcome to come. I think now would be good for you and then we'll go to any other folks on the phone related to any sites whatsoever.

So let's hear first from D'Lanie Blaze who is the petitioner for Santa Susana sites.

Ms. Blaze: And De Soto.

Mr. Katz: Right. Yes. I throw those together. I shouldn't.

Ms. Blaze: Well, we have to refer to them as separate sites, right?

Mr. Katz: Absolutely, absolutely.

Ms. Blaze: For the time being anyway. As the petitioner for SECs 235 and 246, Santa Susana and De Soto facility we submitted some additional information at the Oak Ridge Work Group meeting in August. So I have some brief observations on SC&A's recent evaluation of that information and an update for the Advisory Board.

We've been talking about the presence of americium, thorium and associated progeny at Santa Susana and De Soto outside of the current SEC periods at both work sites.

And we have also acknowledged, NIOSH has confirmed, that we cannot track worker movement between work areas or even between the work sites themselves, and that we cannot tell which work site a worker was at while monitored or exposed to radiation.

This alone has been accepted as a standalone reason to accept an SEC at other work sites.

Recently we also discussed the inadequate monitoring of site remediation workers after 1988. That was something that was addressed by SC&A in the recent review of information.

In its review, SC&A mentioned the Boeing Company's efforts to be exempted from the DOELAP requirements to monitor workers.

SC&A briefly mentioned a loophole the Department of Energy gave to the contractor. But SC&A did not describe what the loophole was or why it might be important to dose reconstruction.

The loophole relieved Boeing from its responsibility to monitor employees. And it has two important parts that I hope the Advisory Board will consider. First, workers who are administratively affiliated with a non-radiological location do not have to be monitored. That means that employees who are

assigned time clocks outside Area 4 are not required to be monitored.

And we already know that workers routinely went into Area 4 to do work for DOE after clocking in in Areas 1, 2 or 3.

What the Board should also know is that site remediation subcontractors operate their dispatch locations, their administrative locations, out of Area 2.

So site remediation subcontract employees are not administratively affiliated with Area 4. They are not readily considered to be radiation workers based on that alone.

The second part of the loophole has to do with the job title. Any employee with a job title that is inconsistent with radiation work does not have to be monitored for radiation exposure.

This would help to explain why we routinely see workers like propulsion mechanics administratively affiliated with Areas 1, 2, or 3 just by virtue of their time clock location, and their employment records when we were actually able to get them from Boeing show that they participated in site remediation work even the D&D of Area 4 nuclear facilities with no radiation monitoring badge, no radiation data.

This common scenario calls into question the adequacy of the worker monitoring program and it is also considered to be a reason to accept an SEC.

There's strong and compelling indications that workers who should have been monitored for radiation simply were not monitored.

Current site remediation subcontractors require that Area 4 waste be surveyed for radioactivity. But the employees who are tasked with the related job duties are not monitored for radiation exposure because they either have a different job title or

they're administratively affiliated with a dispatch location in Area 2.

So while the waste is essentially monitored, the workers are not. And I ask that the Board take this into consideration when weighing the need for an SEC because I do not believe that we can count on the reliability or the adequacy of the monitoring program or existing worker radiation records.

Now on the americium, thorium issue and the possibility that TRUMP-S operations occurred at Santa Susana I do not believe we can rule it out quite yet.

SC&A referenced the technical progress report that was issued by Boeing in 1998, but they left out the part of the report where Boeing specifies Rocketdyne's involvement in step 6 of the process which is the separation of the actinides that include americium. I think we need some more information.

While NIOSH and SC&A have essentially advised the Advisory Board that there is nothing of real significance in the documentation that we have submitted, they have yet to fully explain their own documentation that confirms the presence of americium, thorium and associated progeny at both work sites until 1999.

The site description confirms that americium and thorium existed in stack emissions data and presented an inhalation risk for workers.

That information can be found in the site description on page 9, Table 4.1 and page 12, Table 4.3.

Now if these isotopes were not used in an operational capacity, what are they doing in stack emissions data?

SC&A also identified americium contamination in a drain line at the De Soto facility, further suggesting an operational use of americium at that work site.

Lastly, we have discussed 1,463 boxes of records that are located at the DOE EMCBC. SC&A indicated that these boxes were made available to them and to NIOSH, but they did not provide much detail about what was found.

The Board meanwhile has patiently given us more time to obtain additional information pending the fulfillment of an outstanding Freedom of Information Act or FOIA request.

So, I want the Board to know that this FOIA was based on Boeing's inventory detail of what's in the 1,463 boxes. According to Boeing several of those boxes contain documentation of DOE transuranic operations at Santa Susana to 2011. According to DOE the reason we don't have our FOIA request yet is because the responsive documents are, quote, so voluminous.

In closing, when NIOSH acknowledged that it cannot conduct dose reconstruction with sufficient accuracy for americium and thorium, NIOSH did not hinge its assertion on whether these isotopes were present in large or small amounts, or whether a worker could expect to encounter these isotopes.

Whether an employee encounters americium or thorium during fuel fabrication or site remediation, the fact remains that a DOE contractor employee has encountered an isotope that NIOSH has acknowledged cannot be dose-reconstructed with sufficient accuracy.

Further we have no way to tell whether a worker who encounters these isotopes is administratively affiliated with Santa Susana or with De Soto facility. Using the radiation data we can't tell which site they were at and we cannot track their movements between the work sites, or between work areas at Santa Susana.

The site description verifies americium and thorium present until 1999. That should be enough. But the current update on the worker records issue which

we were discussing earlier today is we're now seeing with more frequency that the DOE and Boeing cannot verify employment for Santa Susana workers.

We used to get very detailed records and employment verification. Now we're routinely seeing just no records exist.

A lot of these workers with no records exist as their response are able to provide documentation addressed to them from Boeing that identify them as retirees, confirming their hire date and their retire date.

It is highly unlikely that Boeing could not provide simple employment verification for these guys. They're getting retirement benefits.

They're also able to provide copies of their work badges, very detailed EE-4 coworker affidavits, company-issued photographs. We have clear indications that there's obstruction and we cannot obtain complete or cohesive employment data.

This is a reason to consider an expansive SEC for DOE contractor personnel at Santa Susana on the basis that we cannot rule out Area 4 employment for anyone.

Thank you for your continued efforts on these SEC petitions. As always, it's a privilege to represent the workers and to address the Board. Thank you.

Mr. Katz: Thank you, D'Lanie.

Ms. Blaze: Do you guys have any questions for me at all? Thank you.

Mr. Katz: Thank you. Wait, we do.

Member Kotelchuck: I do have one question. You asserted that the GE contract had no requirements for monitoring outside of Area 4. Have you provided -- do you have documentation for it and have you provided it to the staff at NIOSH?

Ms. Blaze: I don't have documentation of it. However, it's understood that Department of Energy operated in Area 4 and that radioactive operations were confined to Area 4.

So typically no one in Areas 1, 2, and 3 would be expected to be issued a badge unless they entered Area 4.

However, the loophole document that I was talking about, there are several letters from Department of Energy to Boeing. SC&A has them. It's the 1200 page FOIA request that I submitted to you guys wherein DOE states if a worker is administratively affiliated elsewhere they don't have to be monitored for radiation.

Member Kotelchuck: Okay. SC&A has them.

Ms. Blaze: Yes. Sorry, yes.

Public Comment

Mr. Katz: Thank you. Thank you, D'Lanie. Okay. On the phone, do we have any folks from any site or no site at all who have public comments for the Board?

Going once. Okay, then. That sounds like that's it. D'Lanie, this is unique. I think we've only had one -- this is the only Board meeting where we've only had one public commenter, but you're most welcome.

And with that, with no further ado, we are adjourned. Thank you, everybody, for a good meeting.

Adjourn

(Whereupon, the above-entitled matter went off the record at 6:03 p.m.)