Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
Y-12 Plant Work Group
Thursday, September 24, 2020

The Work Group convened via Videoconference, at 1:00 p.m. EDT, R. William Field, Chair, presiding.

Present:

R. William Field, Chair
Genevieve Roessler, Member
Loretta Valerio, Member

Also Present:

Rashaun Roberts, Designated Federal Official
Nancy Adams, NIOSH Contractor
Bob Barton, SC&A
Terrie Berrie, ANWAG
Grady Calhoun, DCAS
Nancy Chalmers, DCAS
Rose Gogliotti, SC&A
Joe Guido, ORAU
Stephen Hicks
Lara Hughes, DCAS
Mark Lewis, ATL
Jenny Naylor, HHS
Chuck Nelson, DCAS
Lavon Rutherford, DCAS
Tim Taulbee, DCAS

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Proceedings

(10:30 a.m.)

Roll Call/Welcome by Rashaun Roberts

Dr. Roberts: So, good afternoon. Welcome to the Advisory Board on Radiation and Worker Health. This video and teleconference is for the Y-12 Working Group. I'm Rashaun Roberts. I'm the DFO for the Advisory Board.

So before we move into Work Group business, and I can hear some background noises, so if people could mute, please. That would be great. Can you still hear me?

Chair Field: Yes.

Dr. Roberts: Okay, great. So let's go ahead and move into roll call. And also address conflict of interest. And I'll speak to that with respect to the members of the Board, who sit on this Working Group.

Really, in order for them to be on the Working Group, they really cannot have any conflict. So let me move into the roll call. And I will start with the members of the Board who are on this Work Group, starting with our Chair.

(Roll call.)

Dr. Roberts: Okay, very good. Well, with the attendance completed, I'd like to welcome all of you.

Let me just go over a couple of additional items before we get started. Before I give the floor over to Bill Field, who I had mentioned is the Chair for this Work Group.

Again, in order to keep things running smoothly and with minimal disruption, please mute your phone unless you're speaking of course. If you're on the phone and you don't have a mute button, press *6 to mute. If you need to take yourself off, *6 again.

If you're on Zoom, the mute button is at the bottom lower left hand corner of your screen, I believe.

The agenda and the presentations and other documents that are relevant to today's meeting can be found on the NIOSH/DCAS website. All of these materials were sent to the Board Members and staff prior to the meeting.

So with that business covered, let's get started. And I'm going to turn it over to you, Bill.

Chair Field: Okay, thanks so much. So this is our first meeting of the Work Group. And I know we've been a Work Group for a while, but it's nice to finally have something to work on. And now that we have a start, there's a good number of things that we have to cover today.

So we have an agenda that's pretty straight forward and hopefully we just get to that. So the first thing I have on the agenda is the NIOSH presentation, it's sort of an overview presentation by Lara.

Overview of Y-12 Plant Efforts, NIOSH Presentation by Dr. Hughes

Dr. Hughes: Yes, okay. So let me try to see if I can share my screen.

Chair Field: Yes, looks good.

Dr. Hughes: Can you see that, can you see the presentation?

Chair Field: Yes, yes.

Dr. Hughes: Okay, I'm not sure what it looks like on your end. So, I'm trying to go into presentation mode. Okay, so I'm not sure why it's not at the beginning, okay.

Chair Field: Yes, it looks good.

Dr. Hughes: Can you see the first, the title slide now?

Chair Field: Yes, looks good.

Dr. Hughes: Okay, great that worked. I've never done a Zoom presentation, I've only done Skype, so. Alright.

So good morning, good afternoon. This is the Y-12 update to the Work Group. It's some background on what all is going on with Y-12. It's a large site. There's been a lot of work going on over the course of the project. And there will be more work going on. So there's quite a lot.

I'm the health physicist with NIOSH that oversees this. That does not mean I do the majority of the work, by no means. There is a very large team of the ORAU contract staff that is involved in this work and they know vastly more about the site than I do. So, I just like to give credit where credit is due.

So, this my overview. I give you three slides of background, which again does not even come close to the scope of what Y-12 does or did. But I just tried to keep it somewhat brief.

I talk about the SEC petition history for the NIOSH project. There have been several. Then I'll focus on the SEC-250, the current, somewhat current petition evaluation. And also I'll talk a little about the Evaluation Report Addendum and what the status is of that.

Briefly, addressing what's going on with the co-exposure effort and the Y-12 issues matrix. And then at the end we'll address the recent petitioner's submission. So the petitioner for the most recent SEC submitted a write-up with some issues and we would like to address those. And then there will be room for questions and discussion.

So, Y-12 background, it's an 811 acre site. It's located in Oak Ridge, Tennessee. It's about three miles long, half a mile, a little over half a mile wide. It's a very large site. The peak employment was 22,000 workers. And they're roughly down to 5,700 by 1998. And the EEOICPA covered period is 1942 to the present.

A little bit of the site history is generally divided into three, what we call three eras. The first, the very first era that goes to 1946 was the uranium enrichment, and the calutrons. The second era goes roughly to 1994 was cold war nuclear weapons components manufacturing, which includes production of key components of nuclear weapons. Stockpiling of highly enriched uranium and technology development for new weapons designs.

The third era after 1994 consisted of what we call multiple new missions. They continued storing of highly enriched uranium, smaller scale of weapons parts production. And also looking into environmental and waste management issues.

The last two SEC petitions that were done for Y-12 focused mostly on the thorium that was processed at the site. Because it's a large challenge from an internal dosimetry perspective.

So the production of thorium parts began in 1959. This process involved what we call arc melting, which is a process where the thorium is melted into various shapes. And those shapes are then

processed to produce metal parts for nuclear weapons.

The arc melting, the issue with arc melting is that the not only the thorium that is present in the metal, but also the thorium decay products. Because thorium is a member of a decay chain. And what happens is that the radium that's a part of the decay chain, volatilizes before the parts of the decay chain. Volatilize, so it creates an internal dose hazard.

The main production period is 1961 through the mid-1970s when metric ton quantities of this metal were processed. And there was a smaller scale effort that went on until 1989.

And In 1994, the plant was moved into a stand down mode. And the only thorium work that went on after that was like special work projects.

I'd like to point out though that the thorium production was a small, was a relatively small part of the overall Y-12 effort. The main thing they processed is uranium.

So, as for the Y-12 SEC petitions, here's the table. The two top rows they're kind of pink colored. This is the current effort that is going on. So, SEC-250 was evaluated last year. And NIOSH recommended that the Class be added to the SEC for 1976 through the middle of 1979.

And also determined that dose reconstruction is feasible for part of the qualified period. And part of the qualified period was also reserved during that evaluation because some additional research needed to be done. And that period is from 1987 to 1994. And that is an ongoing effort.

The previous SEC petitions, SEC-251 was evaluated

around '19 -- sorry, 2018, and added the Class to the SEC for Y-12 for 1958 through 1976. And this was also, that was due to infeasibility to reconstruct doses from thorium, and plutonium-241. And there's some early SEC Classes that effectively added all the period up to 1957 to the SEC.

So, this most recent petition evaluation, SEC-250, this Evaluation Report was presented to the Advisory Board in August 2019. Again, a Class was recommended to be added to the SEC from the beginning of 1977 through the end of July, 1979. This Class became effective in November of 2019. And it determined that dose reconstruction is feasible for the period that was not recommended from August 1979 through the end of 1986.

And again, there was a reserve period starting in 1987 going through the end of 1994. This period was reserved because there were data accessibility issues at Y-12. Essentially, we were looking for thorium in vivo data. And we knew it was available, but we didn't actually have it or have access to it. And so, we needed more time to evaluate this.

SC&A has since issued a review of SEC-250, Evaluation Report that came out in February of this year. And also NIOSH has issued a response paper to the SC&A review. And I'll get to that in just a minute.

So, for SEC-250 the petition qualified based on basis F.4 for issues related to in vivo thorium data. It's actually an issue that came out of the previous SEC evaluation, SEC-251, which was an 83.14 petition. The reason it has a higher number has something to do with how long some of these evaluations take, and when the petition was received.

So, what we evaluated was the feasibility to

reconstruct internal doses from thorium. Again, during this evaluation we identified three different periods, 1977 through 1979, when thorium internal data is only available in milligram results. We have no calibration data available. And therefore, the thorium dose reconstruction is infeasible and NIOSH recommended the Class.

From 1979 through 1986 the thorium in vivo data are available and they have in vivo count data for lead-212 and actinium-228 available. These data can then be used to bound internal thorium doses with available methods, and therefore NIOSH concluded that dose reconstruction is feasible.

From 1987 through 1994 thorium data are available but they had to be collected and analyzed and evaluated. And therefore NIOSH recommended to reserve that period until the time when we had a chance to look at this data.

The SEC-250 Evaluation Report by SC&A, I do believe SC&A will actually present this today and go into a little more detail. And I'm going to address this very briefly. There are four findings, 12 observations. And some of the main points were the scope of work of thorium, process, the quantity and quality of the thorium in vivo data. They looked at job categories. They looked at uranium, the uranium data that was used in the existing co-exposure model for Y-12. They addressed some exposure at Y-12 to workers machining uranium or machining metal parts. And they also had a finding on exotic radionuclides, especially plutonium-241, which actually is related to RPRT-90, which actually an ORNL effort. So we don't really address it under Y-12.

So, NIOSH issued a response to the SC&A review of SEC-250 that came out in June of this year. And really a lot of the findings were kind of addressing

or going a little further ahead than we are with the thorium evaluation at this point. A lot of the findings were kind of pursuing or looking at a potential future thorium co-exposure model. And what would be required of that.

And so we actually are not quite there yet to issue a co-exposure model. So to address these comments what we're willing to say is that any thorium co-exposure model will be based on the new co-exposure guidelines. And also, you know, at the level of the data completeness evaluation.

One issue was regarding the thorium inventory data lacking and we actually were able to collect some inventory data late in 2019. And that is available now in the NIOSH Site Research Database. There's also some comments on the existing co-exposure models.

And as most of you are aware, there's new guidelines for co-exposure models so any revision of existing co-exposure models would follow those new guidelines, including the one for Y-12. That's actually on ongoing process right now.

One finding regarding the monitoring ability of plutonium-241, NIOSH responded that this addressed in the previous Evaluation Report, SEC-251 when it states at what date the data becomes available for this nuclide and monitoring capacity is there. And overall there's some remaining issues for RPRT-90 and those are addressed under the ORNL effort.

So, the Y-12 addendum, again the reserved period is 1987 to 1994. What we had to do to address this -- to complete this addendum was additional data requests to Y-12 for in vivo thorium data.

And this data has been received by NIOSH. We do

have the data, and then but this in the form of database output, so there had to be several calls and emails to Y-12 to clarify and corroborate information on thorium data.

So, just because the data is in the form of database, doesn't necessarily mean it's necessarily easier to use for the people analyzing it, because they need to go through significant effort to understand what exactly this data represents.

There were several different issues with the available data. One involved the lack of lead-212 channel data in the records from 1992 to 1994. And that was actually something that we were able to address by some analysis that was done by Dr. Neton. And this was published earlier this year in the form of DCAS RPRT-8 that is available on the NIOSH website.

And the current status of the addendum is that it will be finalized after receiving final data clarification from Y-12. With Y-12 their response had been hampered a little bit by the current situation, in that not all of their staff is or was working in the office. So, there has been a little bit of slow because of that.

So, co-exposure model revisions, the current effort on this front for Y-12 is the revision of the external co-exposure model using current methods. And that addresses the need to update some of the older OTIBs 44, 45, 46 and OTIB-64.

And what that specifically involves is to perform the data analysis of Y-12 data using the new guidance. And completely revise the existing external co-worker model -- co-exposure model, sorry, with the new guidelines. And I think once this is completed, I think we might look into the internal co-exposure model, but I could not give you any timeline.

So, what this involved is the database evaluation. Y-12 has a lot of the data they require. So the data is available in various databases. But again, this data has to be looked at and understood, and has to be figured out basically what it means. And what do we do if it's not in exactly the format that we need?

So, what's currently going on is that the instructions are being developed to do the statistical analysis. There were several questions to the Y-12 dosimetry staff to clarify issues with the datasets, so the statisticians can correctly interpret the data.

Some of these issues, for example, involved things like the exchange frequency of badges, wear time gaps, wear time overlaps, which means if there's gaps in the dosimetry data, what exactly does that mean and things like that?

We did receive responses back from Y-12. They were actually very helpful, very responsive and provided answers. And we received that back in mid-September so that's being looked at and addressed, and then this effort is moving forward.

The next thing that's going on with Y-12 is the Y-12 issues matrix. This is something from way before I started on the project. There was an SC&A review of the Y-12 documents, the TBD and some of the TIBs from around 2005. I had first became involved in that around 2008, when there was an effort to address some of these issues.

However, then what happened is that the former Y-12 Work Group retired. And this effort was put on hold. Since then, lots of the documents have been revised.

So, some of these issues might just have been addressed through a revision, and data being incorporated. We've also incorporated several SEC

Classes and the new co-exposure models are on the way.

So, where we're at now with this is that we have to reassess what of those issues remain and need to be resolved. And lastly, there has been some communication from the petitioner for SEC-250.

The first part was that they contacted NIOSH with a suggestion that we should interview a former worker from Y-12 that had experience with the in vivo counting facility. And so this individual was interviewed along with the petitioner.

And there were some issues addressed, or some points were made by the interviewees, such as that the workers received hand contamination from machining. That employees were indeed surveyed before in vivo counts, but the survey also sometimes was a reason that people were rejected for in vivo count, because they were being contaminated.

There was some allegations that survey meter use was done incorrectly, which would suggest a bias towards detecting surface contamination when none was present. And then that contaminated workers were deferred from receiving an in vivo count.

It was stated that workers were restricted from work if they were found contaminated. And kind of the contention was that this might have produced a frequency of in vivo counts that might have shown exposure in workers.

The transcript for this interview will be available in the Site Research Database. It's not currently there yet because it's still in the upload process. This was done, the interview was done within the last month and the interview transcript has to be cleared before it's uploaded.

So there was some additional submission. It was a write-up submitted that was titled, Analysis of Working Conditions, Worker Exposures and Monitoring, from 1980 to 1994. Those were received in August and that is available to the Work Group, and SC&A, in the DSA application.

The issues that were raised in this document were compliance issues. Some discussion of the database quality for Y-12. There were some issues were brought up from the previous SC&A review of the Y-12 TBD from 2005.

Some contention was made that worker records are not available for dose reconstructions. And there was this issue that machinists were not wearing gloves or long sleeves when they were machining uranium parts because of the entrapment hazard.

This was reviewed by NIOSH, and in a nutshell, there's no information that would indicate that there's an infeasibility for thorium in vivo dose reconstruction. Or any of the other nuclides such as uranium for the reserved period.

So, I have a little more detailed table here that addresses these issues. So, the first issue was that the CER dose records are not of sufficient quality and can therefore not be applied for the NIOSH coworker model. And the reference that was used was for a very specific item related to this CER database.

And we looked into this reference and found out, you know, the CER database has undergone a quality control and has been found suitable for use. And also one contention was that the dose data that is reported from this database is not sufficient. But, you know, I'd like to just point out that NIOSH uses bioassay data when they do those. They do not use the reported doses.

There was a statement that the lead-212 background level is too high for in vivo analysis of thorium. This is not something that we were able to find in the references provided with this document. What we found when analyzing data for the addendum is that the lead-212 lung count methodology, or that the lead-212 data from the lung count is available. And there is a methodology that is available for dose reconstructions starting in the middle of 1979.

There was a statement made that thorium lung counting was discontinued in 1984. And we have not found that. That might be an issue with how, what do you call it? I mean if you called it thorium analysis, you may not find it in the records because the radionuclides that we look for is actually actinium-228 and lead-212, which are used to infer the thorium lung burden from the in vivo count.

There was a statement that insoluble, internal dose monitoring was not done until 1981. That was a very specific comment related to Y-12 reinstating fecal monitoring. It's not directly related to the NIOSH ability to assess internal doses, because suitable bioassay is available at Y-12 prior to 1989 as defined in the Technical Basis Document and other documents.

There was a contention that bioassay for some workers was more frequent than for others. Generally NIOSH has not observed, excuse me, that there's a bias toward salaried workers in the records. But, you know, this is something that could be addressed with the available dose reconstruction method.

Again, there was the issue of machinists being required to work without arm/hand coverings. That is a very valid issue with that. NIOSH has reviewed and actually can address in dose reconstructions

when necessary.

And also that some machinists were not monitored. Internally unmonitored dose can be assigned using the co-exposure models. There was a statement that supervisors determined who needed respirators. That is not directly related to whether or not NIOSH can do dose reconstruction. And generally for respirators that's taken into account during dose reconstructions.

There was an issue that uncertainties in bioassay data needed to be addressed. This was related to the super S plutonium and 48 hour samples. This was from the, I do believe it was from the early activity review from 2005. This has been, to some extent, addressed.

Methodology for super S plutonium has been developed, and some other issues related to bioassay data may still need to be addressed. We still need to look into that.

There was a statement that air monitoring is insufficient to estimate internal doses. This was specifically related to environmental dose, I believe. And we looked into this allegation, and this is something related to, yes, the environmental TBD which at this point provides an alternative methodology to arrive at a more claimant-favorable estimation of environmental internal dose.

And I do believe this is the last slide. There were several issues that came out of the Tiger Team report for Y-12, some findings related to air monitoring. Again, those are somewhat, they're more related to compliance issues and they do not affect the dose reconstruction feasibility for Y-12.

There was just allegation that other radionuclides were not monitored. Again, this was related to the,

this was related internal dose. And that is addressed in the revised version of the TBD which contains guidance on the interpretation and assessment of exposure from the nuclides listed in this Petitioner's submission.

Some additional assessment may be needed on this part. This is also something that will be addressed in the issues matrix revision. There was one finding regarding 10 CFR 835 requirements on PNADS. This is not something that would affect NIOSH dose reconstruction.

There was several DOE regulation issues such as workers eating or smoking in work areas. Again, this is a compliance issue that does not impact the NIOSH feasibilities to complete dose reconstructions for Y-12 claims.

And another statement was that worker dosimetry data is not available, or that it is incorrect. Not sure, there might be a difference between what, you know, an individual, a former employees might be able to receive from the site and what NIOSH typically receives in response to the request for dose reconstruction.

But worker dosimetry data at Y-12 has been reviewed and found suitable for dose reconstruction approaches and co-exposure models. And again, the issue was that workers have trouble accessing their own records. And it assumes that NIOSH has the same issue.

NIOSH does receive worker records from Y-12. So that has not been an issue. Y-12 has been very forthcoming with -- or has been forthcoming with information when asked.

And that is my update to the Work Group, so I'll give it over to questions and discussions. I know it's

covered a lot of ground here, so.

Chair Field: Lara, thank you for that interesting presentation. You're right it does cover a lot of ground. So, it sounds like we've a number of unsolved issues with the co-exposure model completion, and then matrix issues. So it sounds like there's a good bit of work to do yet.

Dr. Hughes: There is, I wouldn't say unresolved issues with the co-exposure model. It's just that it takes time and work and effort. It's a large effort and so it's not so much a problem, as it is a large effort at this point.

Chair Field: Probably the effort I guess.

Dr. Hughes: Yes, well.

Chair Field: Just in that way. Yes, so I want to make sure Gen has a chance. I'm not sure how long she can stick around. Do you have any questions, Gen?

(No audible response.)

Chair Field: She's still with us, I think. Yes, she's still with us. Gen, you on mute by chance?

Well, I think she's still there, well it says Owner is still there.

Member Valerio: Dr. Field.

Chair Field: Yes.

Member Valerio: This is Loretta.

Chair Field: Okay, Loretta. I don't see Gen. Do you have any questions?

Member Valerio: No, but I have an urgent call, so I need to step away for about two minutes.

Chair Field: Okay.

Member Valerio: Okay.

Chair Field: Okay.

Member Valerio: So, I will be right back.

Chair Field: Okay. Our Committee got much, much smaller. Gen, I still see you're there. Are you able to hear us, do you have any questions?

(Simultaneous speaking.)

Member Roessler: I'm here, everything on is still punched, yes.

Chair Field: No questions?

Member Roessler: No questions.

Chair Field: Okay, I just had a quick question. In the exposure model, is thoron actually included within that model for exposure?

Dr. Hughes: I'm sorry, could you repeat the question?

Chair Field: Yes, is thoron included within the exposure models?

Dr. Hughes: No.

Chair Field: Okay. Is there a potential for thoron exposure?

Dr. Hughes: I'm not sure. It has not been addressed.

Chair Field: Yes, I'm just wondering. Maybe it's something someone else could address or we can discuss at a later time?

So I guess at this point if there's no other questions, maybe it'd be worth probably to move on to SC&A review? And Bob, you able to present that?

Mr. Barton: Yes, absolutely. Can everybody hear me okay?

(Simultaneous speaking.)

Mr. Hicks: This is Steve Hicks, I just --

Chair Field: I'm sorry, Is someone else talking?

Mr. Hicks: Yes, this is Steve Hicks. I just want to make the Work Group aware that 9203, Beta 3 was a Oak Ridge National Lab building, but it was located on the Y-12 side. And the Y-12 employees is the ones that was in the building.

And they also, you know, had plutonium-241. And they had it stored in that building, up to, into the cleanup in and around 2007/9. You know, when Obama issued money for the cleanup. And that was still in the building at that time. So I just wanted to make the Work Group aware of that.

Chair Field: Okay, thanks Steve, I appreciate that.

So, Bob do you want to share your screen time?

Mr. Barton: Yes, can everybody see?

Chair Field: Yes, we can see it.

Mr. Barton: Slide show should have just popped up. Okay, great. And can everybody hear me okay?

(Simultaneous speaking.)

Chair Field: Yes, there you go, looks good.

Mr. Barton: Alright, great, great. Alright I'll move right along here. This first slide here is sort of a

repeat of what Dr. Hughes already covered. So I won't spend a lot of time on it.

But I think one of the main things here is that as you see, investigation is mainly centered around whether it's feasible to reconstruct thorium exposure, though there are a couple of other issues that were discussed at the August 2019 meeting that are also addressed here that were included as part of SC&A's focused tasking for this review.

So this slide here, it describes our review approach. And the real key question from our point of view is, is dose reconstruction to unmonitored workers feasible?

The other side of that coin is if you have a monitored worker, can you use those records? In other words are the measurements adequate to be able to use in dose reconstruction?

But beyond that, and we'll address adequacy with thorium in vivo monitoring later in this presentation, but I think the main question here, and as Lara indicted, a lot of the responses to SC&A's review centered around the development of a co-exposure model, which again, has relatively new implementation criteria.

And the three main sort of facets of that criteria are completeness, adequacy, and representativeness. So we're going to get into each of those.

As I said, there was an additional concern, regarding uranium exposure that was discussed back in August 2019. And it was brought up and specifically with exposure of machinists who were doing that sort of metal work. So SC&A was tasked with specifically looking into that as well.

And then the other facet of this is what about other

sources beyond thorium and uranium exposures at Y-12? Because there was sort of a wide variety of work going on in those three facilities down in Tennessee. So we'll address that briefly as well.

However, that review really centered around a separate report, RPRT-90 that SC&A also reviewed back in 2018. But we'll briefly address how that applies here.

So, the first thing we looked at in any type of these reviews is what is contained on the Site Research Database as far as documentation? We really want to see if there's more information about production, the management, the thorium, information about worker exposures and different exposure configurations.

And as I said before, the efficacy of the method. Is the in vivo method used to measure thorium adequate? And for monitored workers, and if it's adequate for monitored workers, then the follow-on question is can it be used to formulate a co-exposure model for those workers who are not monitored?

And so we looked at captured documents and these really go again to that adequacy completeness and representativeness. So adequacy again, can we use the method to accurately measure the exposure we're interested in? In this case, thorium and its daughter products, completeness, again we're looking for documents of what locations handled the thorium.

The Site Profiles for Y-12, which was back in, I think it was last updated in 2007, contains a fairly complete, but maybe partial list. So we did discover some additional documentation in the Site Research Database that expands a bit, and mostly confirms that list that was found in the TBD, which again was

updated way back in 2007.

So our review has a list of about 14 specific locations. But it's really not clear to us from the documentation, to what extent or what time periods they were necessarily were specifically thorium areas. Did they share operations with uranium? So there's some uncertainty there.

You know, also what was the magnitude of this source term over time? Are there other potentials or sources of thorium exposure that really have not been considered yet in the ER? And this review also included three particularly germane interviews with former workers that were conducted back in 2018 regarding thorium.

Now, so that's sort of the completeness approach for SRDB documentation. We're going to get into some completeness analysis and the actual dataset in a little bit.

And then that third facet representativeness, what types of workers and specifically job types were included in the thorium processing, and by extension should have been monitored, or were monitored?

And again, we have interviews and other documents. And if you look at Table 1 of the SC&A review, there were a number of specific job titles that were found in the SRDB documentation that would be associated with thorium work.

These would include the radiological engineers, process quality control workers, procedure coordinators, system engineers, supervisors, process engineers, boilermakers, plant maintenance, chemical recovery, machinists, your laborers, janitors, and material handlers. That was the list we got from, specifically from

documentation.

There are probably more, and as you'll see a little bit later, we did do a job specific scoping analysis. Just to get an idea of who in that thorium dataset was actually monitored and who we have records for?

The other thing we looked at is what departments typically handled the thorium work? And again, we looked into the SRDB, that's the Site Research Database. And we had trouble necessarily differentiating specific thorium departments from uranium departments. It seems there was a lot of overlap. They might be doing thorium work at one time and uranium work at another time.

So, if you look at Table 2 in our report, we listed 33 distinct department numbers that we found in the documentation that had the potential for thorium work, but the question is, is this list exhaustive? We really don't know. Tend to think it probably isn't but that's the state of information we had when we did this review.

And this comes with Observation 1, and I'll just read this one because it's important to understand that when we did this review, there are some limitations because of key information and data we had at the time. But again as Dr. Hughes indicated, as co-exposure models are developed, each of these facets really should be filled in with additional data and information.

So, anyway Observation 1 and I think this one is important to sort of read into the record, says, "Although SC&A uncovered additional information concerning process departments and areas associated with thorium work, no definitive list was identified to aid in assessing the scope of thorium monitoring at the Y-12 plant.

"Sought-after documentation might have included those workers actually classified as thorium workers in addition to department and work area designations. Such information would have aided in evaluating the monitoring program's effectiveness."

And as Dr. Hughes indicated, the response, and this is a common theme, is that essentially these issues that SC&A brings up should be addressed through the proper implementation of new co-exposure guidelines, which I believe were possibly approved by the Board, I believe last year.

If anyone has any questions, please jump in. Otherwise I will just keep going on.

Okay, now this is specifically talking about the completeness of thorium data that we have in hand. So, the typical way we do this is you find an overall report, and usually these would quarterly reports or monthly reports by the Health Physics Department that actually lists how many people or how many samples you have in a given timeframe.

And then we compare that total to the number of samples that we have in hand that were used in co-exposure models. Now, unfortunately, the state of the data when we did this review was that we only had those HP quarterly reports for eight of the quarters during the period of interest.

And this was not because the other HP quarterly reports didn't exist. It's that they simply stopped reporting the total number of thorium in vivo counts.

So we had those reports up through the third quarter of 1981. And then obviously the period of interest we were looking at here specifically ended in 1986. It's because after that period it is reserved.

So that was essentially Finding 1. So there's very limited information available to determine the completeness of the data we have in hand. But for the limited comparison we had for those eight quarters, it showed a pretty good agreement. We had about 95 percent of the data in hand, when we compare it to those summary reports.

And the NIOSH response is again, is NIOSH really committed to a full completeness evaluation during the formulation of their co-exposure model, which again will be in line with the co-exposure guidelines?

Sort of a parallel observation here, that was Observation 4, was that SC&A found additional thorium monitoring records that may supplement. Some of the in vivo records were actually designated as uranium, though during the uranium count, they also reported lung burdens of lead-212 and actinium-228 that might also be used to expand on the dataset we currently have for co-exposure modeling.

And NIOSH's response was that again, they intend to perform a formal completeness analysis and that will include any additional records that are captured, including the ones identified by SC&A.

Moving onto slide 6. Aside from the comparison to health physics quarterly reports, another potential way you can evaluate completeness, though rather more indirectly, is you can compare the number of samples you have during a given period, and the number of workers that are sampled, to what the actual production activities were on a temporal basis.

So if you have a certain year where a significant amount of thorium was processed, you'd want to look and see, well was there a marked increase in

the number of samples, or perhaps the number of workers who are included?

And that would give -- now if the opposite was true and suddenly you see well during that year and subsequent years, you know, there's really no data, well that might pose a problem from a co-exposure model.

To try to do this, we did find one reference, it was titled, The Historical Review of Accountable Nuclear Materials at the Y-12 Plant. However, at that time the key piece of information, which was throughput of thorium to the plant, was actually redacted from the document. And so that was the source of Finding 2.

NIOSH responded with information again. Their response earlier this year was that, I believe they actually captured a more complete picture of the thorium throughput as part of the recent data capture addendum in 2019, or that really postdated this review. So this, Finding 2 might be taken care of just by the fact that we have more data on that throughput to actually compare again with the data we have in hand.

Moving onto adequacy, and as I said before, the key question here is, is the analytical method effective? Is it actually measuring accurately the exposures we're trying to reconstruct? And this one is interesting because there's actually precedent for this particular monitoring method for thorium already in the EEOICPA program.

The same technology that was used at Y-12 was used in the development of what's called the Mobile In Vivo Radiation Monitoring Laboratory. Again, Y-12 developed that, and it was used in other sites, notably Fernald. I believe it was also intended to be used at Paducah and Portsmouth.

So this technology that we're looking at was actually already sort of evaluated during the Fernald SEC, which is SEC-46. And SC&A was part of that review. Our internal dosimetry expert, Joyce Lipsztein was part of that review. And really any issues that were part of that technology were adjudicated and was found to be suitable for dose reconstruction.

However, one thing that came out of that SEC-46 review was that it was found that a negative bias may have existed for some of the years and some of the measurements, meaning you would need some sort of an adjustment factor to account for that in the measurement technic. And again, that was reviewed by SC&A as part of the Fernald SEC. And adjustments were developed under that SEC review.

And NIOSH has agreed that they will formally evaluate the potential for bias as part of its co-exposure monitoring development, and to assess the adequacy of the method. But as I said, the technology itself has really already been adjudicated in this program.

Representativeness, this is a really important aspect of whether you can adequately apply co-exposure intakes to an unmonitored worker? Now the implementation guidelines that are referred to, that all new co-exposure models have to adhere to, really describes three types of internal monitoring, in a general sort of way.

You have your routine representative sampling, sort of a blanket sampling. You have routine measurement of the workers with the highest exposure potential. So really targeted sampling. And then there's incident-based sampling, where you only monitor if there's a reason to monitor. There was no real routine program in place.

And one way to evaluate that is to look at job title information. And see, alright, which workers are included in part of this set of monitoring data that we are going to try to apply to unmonitored workers? Unfortunately, job title information was not available for all of the thorium data points.

But what we can do is we can look at a subset of the claimants who are among that monitored population. So that's one way we came at it since we didn't have job title information for every single monitored worker. But we can at least look at a subset.

So, what we did is we classified the claims that were monitored to eleven generic categories that we came up with. Sort of our, really our professional judgment. And again these were claimants monitored for thorium. And we looked at the number of samples that were included in the dataset. And also the number of workers who were monitored.

So, if you look at Figure 2, of the SC&A report and the number of total sample included, again among that claimant subset, the highest represented category from a total number of samples, again this is not number of workers, but number of samples, was the Health Physics staff. At about 28 percent of the total samples among that claimant subpopulation.

And behind that was radiography and inspections, operators and assembly workers. They were often also referred to as weapon assembly workers.

And I would note that often these workers who are in this category, would alternately describe their work as machinists. Again, machinists will be discussed a little bit later in this presentation. And following that was E&I and maintenance personnel.

So that was the number of samples, and that was in Figure 2. Figure 3 in the SC&A report looked at the total number of workers, regardless of the number of samples. And it's really the same general category, radiography and inspection, operators, assembly workers, E&I, and maintenance.

Administrative and inventory workers also had a high percentage relatively of the monitored population. What's noteworthy is when we looked at the number of workers, health physicists while they had the highest number of total samples, they had far fewer actual monitored workers when compared to the other job categories.

So, that's sort of our look at representation among again, the claimant subpopulation. We also tried to look at department codes to see if there were certain departments from the monitored dataset that really either dominant the records, or are not included.

Unfortunately, we don't have a list necessarily to translate a department code to a specific name or location on what they did. One department code we did, we were able to identify was code 2373, which again was associated with health physicists. And they had a very similar number of records as what was found in the claimant subpopulations.

Also interesting from that analysis, is that directly 54 distinct department codes that we observed in the in vivo dataset. So 54 different department codes seems like a lot. But almost two-thirds were associated with just five of those department codes.

Despite that, I mean looking at this data, there's no real discernible trend. Like I said there's a high number of samples for health physicists, but it's not necessarily geared towards one job type. It's pretty spread out if you look at those figures.

So, what SC&A concluded from this, and this is in Observation 5 and 6, is that the most likely, I guess, categorization of this monitoring program is probably routine representatives.

Because you also had a high number of administrative inventory workers, but you also had a high number of the operators, assembly workers, which again were often described as machinists.

And NIOSH's response again is that these of issues will be evaluated during its formulation of the co-exposure model, to determine if the dataset is truly representative.

Moving on to the uranium, and again, this is one of the facets that the Advisory Board wanted us to look at when this was tasked to us back in August of 2019. And again, we're looking at completeness and representation.

Completeness, we did the same exercise as for thorium by comparing those health physics reports with the data we have in hand. And that comparison was available for all but one quarter during this period of interest that we were looking at, which was up to 1986. However, there was also numbers available for 1987 and 1988.

The range by any individual year was 75 percent, in other words 75 percent of what the health physics reports were indicating, again by quarter. It says by year, but it was actually by quarter. That's a mistake on my part.

So in some months the low was 75 percent, data on hand. But in other months it was 120 percent of the data on hand.

In other words we had a lot more than what was indicated. And if you look at the completeness

overall for the entire period when we did the comparison, it was about 98.4 percent which is pretty high for this, compared to other sites where we've done similar work.

As far as representativeness, unfortunately, we had no information in the uranium dataset to allow for a job title or department code assessment, as we were able to do for thorium. And that was Finding 3.

So at that time of our review, we couldn't really say anything about how representative the uranium data was for co-exposure model development and representing workers who were unmonitored.

Again, NIOSH's response is that these types of issues and evaluations will be performed as part of the co-exposure model development. The other thing that SC&A identified specific to the overall uranium data is that there's in vivo as well as the in vitro data.

And so we said to ourselves, well is there a group of workers out there who should have been monitored by in vivo and weren't? But the co-exposure model uses urinalysis data. You know, how do those workers get represented if they should have been in vivo, they don't have the data, and the co-exposure assignment is based on in vitro? You know, how does that all work?

And again, NIOSH is committing to evaluate that available data and to see how useful it would be in developing co-exposure intakes in a claimant-favorable manner.

What about the machinists? Again, this is a specific concern by the petitioner and discussed at the August 2019 Board meeting. So what we did is we took a review of the claimant population to identify machinists, and let's see how many of them were

actually monitored for uranium?

So we've done that 47 percent had internal monitoring records with the caveat that they were also wearing a dosimeter. So, what does this really mean for dose reconstructions?

Well, and I'll explain this in a second because you may be scratching your head on this. What we found is that 51 percent of the machinists we observed, did not even require a co-exposure assignment. In other words, their records they have are adequate to just use, you know, regular dose reconstruction manner. They did not need a co-exposure assignment.

Twenty four percent would require at least partial co-exposure assignment, in other words there was unmonitored periods in their covered employment that would typically be considered it's unmonitored, but they should have been monitored, so they should be assigned a co-exposure dose. And 25 percent roughly would require a co-exposure assignment for the entire employment.

Now, you might be asking if only 47 percent had internal monitoring for uranium, how could 51 percent not require a co-exposure assignment? When we looked at that 47 percent number, I looked at anyone, any dosimetry records, regardless of whether they were in a covered employment period by DOL or not.

When I narrowed that down to do the -- what about the dose reconstruction numbers, I only considered periods that are considered covered by the Department of Labor. So that's the difference between those two numbers.

In addition to that, looking at the claimant population we wanted to ask some questions, and

see what we could see in the data about exposure potential for machinists compared to other types of workers.

So, what we had was average uranium air concentration data for three categories. We had metal fabrication, which was described as a machining operations, the machinists. And then two types of metal preparation.

And what we found was that in all but two cases, the fabrication, that's the machine operation samples, again only on average, were bounded by the preparation category air samplings. And that's in Figure 8, and was the subject of Observation 9.

So, that's a limited look, but it is one piece of evidence that sort of looks at, do we have a group of workers out there who weren't monitored but should have been, and had a significantly higher exposure potential? To the point where we can't develop a bounding dose for them. In which case, dose construction is not feasible.

And the NIOSH response gets into the concept of stratifications. Do we have enough data, if that is the case, and we determine there's a group of workers out there that had a higher exposure potential?

And do we need to develop essentially a separate co-exposure model, a separate distribution to cover those workers, but to stratify a co-exposure model into two or more parts to cover that? And so NIOSH will be looking at that as part of their co-exposure analysis.

And the final thing is what about other sources of exposure beyond uranium and thorium? And as noted previously in the NIOSH presentation, there's a lengthy and complex document, RPRT-90. SC&A

did review that document. There are a number of issues that are currently under discussion based on that document. And that's what Observations 11 and 12 point out here. So those issues are in the queue so to speak. And will be handled with the RPRT-90 review and discussion going on per Oak Ridge.

Now this middle bullet concerning plutonium-241, which is Finding 4, this one was really born out of SC&A's review of RPRT-90. RPRT-90 actually noted in it the following sentence that, Items Requiring Additional Evaluation, the one remaining, plutonium-241 was processed and handled on the Y-12 campus. And as such, not addressed further in this document.

So it was sort of left out. Based on that sentence that's how we read it anyway. And we had noted that plutonium-241 was actually part of a previous Class added to the SEC for Y-12 under SEC-251. Again, this is talking about today's SEC-250, but SEC-251 went up through 1976.

And NIOSH's response to this finding, they said, well SEC-251 as opposed to what we're talking today, concludes that dose reconstruction to plutonium-241 is feasible at least after 1966 when they found viable bioassay data.

So, I went back and sort of prepping for this meeting, because I don't believe SC&A did any sort of review on SEC-251. We typically don't because the Class was recommended, so what is there for us to really do?

But I found on Page 18 of that Evaluation Report, it says that plutonium-241 separations began in 1953 and continued through 1973, and provided a reference, which is SRDB 89989 from 1998. And so I dug up that document and it is dated 1998. But I

can't find other dates listed in there to verify that date range of activities with plutonium-241.

I might be misreading the information there, so maybe some clarification I think would be helpful from NIOSH. Because if the operations with plutonium-241 ended in 1973. Then they may not be necessarily relevant to an SEC discussion.

Though I would note that in RPRT-90 the Isotopes Division Report, it does indicate that the material is present, at least at Oak Ridge inventory until at least 1986. It doesn't really indicate what if anything was being done with it.

And so, I guess, two questions, and I don't know if NIOSH wants to comment on them now, is where did that date range necessarily come from? And this can perhaps be sorted out down the line, and determine if there was actually no plutonium work being done after 1973, then the issue may be necessarily an SEC issue.

And the other question is would a co-exposure approach be appropriate for unmonitored exposures to plutonium-241 after 1973, and whether from D&D activities? But to determine that operations did extend past 1973.

So, that is actually the end of my presentation. I don't know if NIOSH wants to expound a little bit on the plutonium-241 issue I just spoke on, or we can just open it up for questions from the Work Group?

Chair Field: Okay, Lara do you want to comment on this question?

Dr. Hughes: Yeah, I would have to get back to you about the dates of operations. The issue, though, is that it's not so much that we focus on the end of operations, but at the point where we can feel like

we can do dose reconstruction using available data. And that is clarified in SEC-251 and that's where we're going from here.

I'm not clear on exactly how much data is available, and I cannot speak to a potential co-exposure model. I do not believe that there is a -- the exposure potential is of that magnitude as in there were not that many workers involved.

Now, the potential unmonitored, I'm not sure how we will address that going forward. I'm not clear if we have enough data to do a potential co-exposure model for plutonium-241.

(Simultaneous speaking.)

Mr. Rutherford: We need to get back to you on that, get back to the Work Group on this and give you a specific answer.

Chair Field: Okay. Thanks, Bomber.

Lara, did you have any other comments about Bob's presentation?

Dr. Hughes: No. I mean, we have responded to the -- there's a formal NIOSH response out and a lot of the issues are related to future efforts, really.

Chair Field: Mm-hmm. So a lot of the issues are going to be addressed as you develop these models?

Dr. Hughes: That is the plan. I can't speak to the extent of it right now.

Chair Field: Yeah. So, I just had a question. In the slide for the uranium data summary that Bob presented, when you're looking at how it completes the data overall or you're looking at representativeness, if there's no data available to

evaluate representativeness, like in Finding 3, what do you do in that case?

Mr. Barton: I'm not quite sure -- it was hard to hear you a little bit, but you said if there was data to evaluate --

Chair Field: You indicated that there's no data available to evaluate the representativeness of the uranium data.

Mr. Barton: Right. We can't -- we can only say, on a temporal basis, that there don't appear to be gaps. When we say "representativeness," it's really asking the question, is there a group of workers out there, for example, perhaps, machinists, where they weren't monitored sufficiently and can we represent those workers with a co-exposure model? Or was there exposure such that the workers that we do have monitoring data for just simply won't bound their doses?

That's really the SEC question we're asking when we talk about representativeness.

Chair Field: Okay. You had mentioned it and NIOSH said they'll look into that issue. So I was just wondering how you look at that issue.

Dr. Hughes: I would have to defer to the data analysis team, because I actually do not look at that issue.

Chair Field: Okay. Fair enough.

Dr. Taulbee: Bill, this is Tim. What we tend to do in looking at the representativeness is we look at a variety of different things.

For one thing is who is supposed to be monitored. And then we'll do some checks to see were those workers monitored, much like what Bob was talking

about with the machinists. And we're looking for is there, you know, kind of a population that is missing. And then when we don't see any evidence of one that's missing, then we assume that, you know, the data set is representative.

And, in some cases, we're looking at large numbers of bioassay here. So, you know, when you start looking at a population and you're looking at thousands of bioassay, you kind of begin to get a feel, you know, it doesn't look like there's really anybody missing here.

Chair Field: Thanks for that.

Gen, did you have any questions?

Loretta?

Member Valerio: Actually, I do.

Bob, if you would go back to the slide that talks about the information that was redacted.

Mr. Barton: Let's see here. Where was that?

Member Valerio: Right there.

Mr. Barton: Oh, okay. There we go, yes.

Member Valerio: So, the information that was redacted, was that specific just to thorium, or to the plutonium-241 as well?

Mr. Barton: I believe, in that specific document, it didn't delineate by the different isotopes of plutonium. It would just simply say plutonium, uranium, and thorium.

We were specifically examining that document for thorium, but, again, I don't think they necessarily had throughput information available on the specific isotopes and weights and such specific to

plutonium-241.

Member Valerio: Okay.

Mr. Barton: We certainly didn't find anything as far as a specific throughput or, really -- again, that's what our question was, the production timeline, did it really stop in 1973? Or, as Dr. Hughes points out, what was the actual exposure potential from that activity? And is there a way to bound the doses for workers who maybe weren't necessarily monitored with a valid bioassay method? Which I believe was developed right around 1967.

And, again, that's part of the RPRT-0090 review that analyzes those 213 really unique isotopes that could have been handled. It's focused on Oak Ridge, but it's sort of parallel to Y-12 as well.

Member Valerio: Okay. Alright. Thank you.

Chair Field: I don't know if Gen's still on. If you have any questions, Gen?

(Pause.)

Dr. Taulbee: Bill, I don't see Gen on the list of --

Chair Field: You don't see her? Okay. So, unless anyone else wants to comment, I guess we can move on to Ms. Vinson and Mr. Hicks' presentation.

Mr. Hicks: I didn't exactly hear what you said.

Chair Field: I said --

(Simultaneous speaking.)

Chair Field: We received your presentation. I was just wondering if that's something that you want to go through and have us look at what you've provided, or it's something you want to share on screen. I don't know if you're able to share or not.

Mr. Hicks: No, I don't have any way to share it on screen. I've got a statement to read, though.

Chair Field: Okay. That would be fine.

SC&A Review of the SEC-00250 Evaluation Report for the Y-12 Plant (February 21, 2020)

Mr. Hicks: Okay. Good afternoon, Dr. Field and members of the Work Group. This is Steve Hicks, SEC-250 petitioner. Thank you for allowing me the time to present the petitioner's position to the Work Group.

Our position is quite simple. NIOSH cannot, and will never be able to, reconstruct dose with reasonable accuracy for the Y-12 Plant. It is not reasonable for anyone to conclude that they can. The evidence I've submitted with the petition is strong. The documents are DOE and the Y-12 contractors' own documents.

Additionally, Ms. Kathy Vinson submitted the one from [identifying information redacted] in the White Paper. DOE and the Y-12 contractors admitted that their records are false.

I'm going to hand this off now to Kathy Vinson, primary author of the White Paper titled "Analysis of Working Conditions, Worker Exposures, and Monitoring, 1980 to 1994."

Ms. Vinson: Thank you, Steve. Well, this is referring to slides that we're not actually able to take a look at at this point. So I won't read those slides, but I'll just highlight the main points.

No. 1, NIOSH says that if a claimant has fecal monitoring that would prove that they were exposed to uranium, yet the Y-12 uranium exposure study said this wasn't done before 1999, so how can

NIOSH assume that only workers with a fecal sample were exposed to uranium?

No. 2, DOE's memo of 1999 states that internal dose assessments are not accurate.

And No. 3, [identifying information redacted] letter to [identifying information redacted]e]states that, prior to 1989, bioassay measurements were not assessed for internal dose, and external exposure data on these history tapes have recently found to include errors. Even SC&A's report of 9/19/2005 found similar issues, and that was 15 years ago. And many of those findings have been ignored.

So, our question is, how can NIOSH say that they can reconstruct dose when DOE and their contractors say they can't? And what more do you need to prove the records NIOSH is using to reconstruct dose contains errors and are not accurate?

Part of this next section is new to the Work Group, NIOSH, and SC&A, and it concerns the statistics of people who were monitored at Y-12. And I'll hand this off to Terrie Barrie, SEC Petition 00250 authorized representative.

Ms. Barrie: Thank you, Kathy. And good afternoon, Members of the Work Group and everyone else.

Yes, we don't have the ability to share the presentation, but it has been circulated. So I'd like to call your attention to Slide No. 11, which is from NIOSH's Evaluation Report.

You may remember that when the Board met in Oak Ridge in August 2019, Mr. Hicks explained that we could not figure out where NIOSH got their percentages. We went to a professional statistician,

Dr. Chris Barker, and asked him to explain what we were missing, but even he could not reproduce the calculations NIOSH has in this table.

In the table, NIOSH shows a number of individuals who are monitored by urine sampling by year from 1977 to 1988. If you add up the total numbers of the individuals monitored by urine sampling in the third column, the total is 12,852 and not 3,675.

SC&A mentioned earlier in this meeting that they reviewed health physics reports and available co-exposure urinalysis for uranium exposure and they found that there was a completion rate of 98.4 percent. The petitioners don't have access to this database or the other documents that NIOSH and SC&A used.

The next slide --

Ms. Vinson: Terrie, this is Kathy.

Ms. Barrie: Yes.

Ms. Vinson: I'm actually able to share the PowerPoint presentation. So if you could just tell me which slide you're on, I'll go to it.

Ms. Barrie: Okay. Well, why don't you start with Slide 11, and give the Board Members a moment to take a look at that.

Ms. Vinson: Okay. Hold on a second.

Okay. Can everyone see that?

Ms. Barrie: Yeah. And so, I was talking about the third column, "Number of Individuals Monitored By Urine Sampling," and the total for Column No. 3 is off by like 9,000 sampling numbers.

Slide 12 is another important one. And if you can

pull that up, Kathy. There you go.

Deb Jerison, the executive director of the Energy Employees Claimant Assistance Project, researched the CEDR database. She was able to ascertain the total number of Y-12 employees who were monitored for external exposure from 1981 to 1988. And, as you can see, the number of employees monitored for external radiation range from 6,000 workers to almost 8,000 workers per year.

I then compared EECAP's data to the Department of Energy's Occupational Radiation Dose Reports for the same years. And those reports are for workers who were monitored for internal radiation. I found that, on average, less than eight percent of the workers who were monitored for external radiation received internal monitoring.

These numbers are not adding up. I don't understand -- we don't understand why there's such a huge discrepancy, and we'd like an explanation of where everyone is coming up with these figures.

And on that note, I'll hand this back to Mr. Hicks for the conclusion. Thank you.

Mr. Hicks: Thank you, Kathy and Terrie. I'd like to add a comment about the statistics.

Just on Monday I found a 1992 report, a Y-12 document about internal dosimetries. As noted on Slide 12, Chapter 2.3.2 states that 50,000 urine samples was collected in about two years, from the end of 1989 to approximately the end of 1991. Going back to NIOSH's table, on Slide 11, only an average of 5,130 urine samples per year were collected, per year, between 1977 and 1988.

The last issue I want to raise is NIOSH's summary of the worker interviews. First, let me discuss my

interview.

I explained to NIOSH that at one time I was sent to the body counter. The procedure was to monitor on the way out of the production area. Then, before we entered into the body counter, I needed to shower and change into coveralls. Then, before you go into the body counter, you were monitored again.

One time I did all of that, but when I was monitored after the shower, the monitor showed I was contaminated. Because of contamination, I was not allowed to enter the body counter.

As shown on Slide 13, the former worker who was also interviewed worked at the body counter. He would monitor the workers before they entered the body counter. He was instructed to contact his supervisor if the body counter come up with a positive reading.

The supervisor would then manipulate the survey incident and recheck the worker. When the supervisor found skin contamination after the body count, the original body count was considered invalid and removed from the worker's record.

I'm not sure why the other worker's interview was included the NIOSH presentation. I have been in touch with him this week and I know I didn't receive a copy of the draft of my interview until Tuesday.

As for the Work Group's path forward, I think you should recommend that the workers who were employed 215 days by 2030 (phonetic) 1989 should be included in the SEC. There are just too many issues that NIOSH chose to ignore to decide anything else. Thank you again and I'll be happy to answer questions.

Chair Field: Okay. Thank you. Thank you for

providing the slides. I think they were very helpful.

Are there any comments from either NIOSH or SC&A or perhaps from --

Dr. Hughes: This is Lara Hughes. I'd just like to comment that it would be helpful if I actually could get a copy of this presentation. That would facilitate answering some of these questions.

Dr. Taulbee: Lara, this is Tim. We did get a copy, sorry, late yesterday.

Dr. Hughes: Oh, I see. Okay.

Dr. Taulbee: I apologize.

Dr. Hughes: I have not seen it. That's why I was like, okay --

Dr. Taulbee: Yes. I apologize for not giving that to you.

I did want to comment a little bit about the table and the discrepancies, or the believed discrepancies there. They are explainable. These are things that we can go through and we will provide a response to the petitioners and to the Work Group with regards to those.

Some of this is coming from getting data from different sources, and clearly, looking at our table, it's not clear as to what we were trying to communicate there. And we're actually mixing a few things together there. So, we will clarify those.

Chair Field: Thank you, Tim. I think that would be very helpful.

Mr. Barton: Well, Dr. Field, from SC&A's point of view I think doing these types of interviews, you had asked before how you establish representation

in a co-exposure model if you don't have, necessarily, job titles to go along with each data point.

And it's really the interviews with former workers that are often very helpful in establishing whether there is a subpopulation or job type of a particular group of workers who was not monitored who we have sufficient reason to believe had a higher exposure potential than those that were monitored.

So, in that way, former worker interviews are extremely helpful.

Chair Field: That makes sense. Are there any other questions for either Mr. Hicks or Ms. Vinson?

Member Valerio: Dr. Field, this is Loretta.

Chair Field: Yes.

Member Valerio: Can we go back to the -- I think it was one of the last slides, or the last slide, where he was discussing the in vivo, if I could look at that real quick.

Chair Field: That's slide 13. Yeah, 13.

Member Valerio: Okay. And, Mr. Hicks, do you recall what year that was?

Mr. Hicks: It was approximately around 1984. Late '84, '85.

Member Valerio: Okay. So, my comment to that is, in the Evaluation Report, on page 9, and I believe it was paragraph 5, it stated that internal dose monitoring or bioassay was not required until 1989, I believe, at Y-12. So I'm a little confused on isn't the in vivo part of the internal monitoring?

Mr. Hicks: This was where I was polishing parts at a

center line with sandpaper and the 235 fines got up beneath my fingernail and caused it to abscess. Just before it did that, that's the time I went to body count and I had monitored out of the area, went through a guard station with a radiation monitor and a metal detector, and when I got to body count, I took a shower and I put on a paper suit. And they come in there to monitor me and they found my finger hot, you know, contaminated.

And they washed it three times and then they wouldn't let me in the area. So, they sent me back and restricted me from work for several days. It was probably a week or longer.

In the meantime, my finger swelled up and busted open and I had to go to medical and they lanced it three times. I went to my primary care doctor and he lanced it. He left it open. And when I soaked it in -- he told me to soak it in Epsom salt and water. And when I did that, the fines -- all the infection come out, plus in the bottom of the cup was actually some little fines of enriched uranium.

And eventually I went back to the body count and I had a body count and then, you know -- but when I went back to the work area, I wasn't supposed to -- I had short sleeves on and we wasn't wearing -- had short sleeves and no gloves, because long sleeves and gloves was a danger around rotating equipment.

So, there I had stitches in my finger and they wanted me to polish that part without gloves. But I wore like a -- it was like a big latex glove. And, you know, I asked them about that and, you know, they kept arguing with me and finally they just give up and let me polish it with a glove on.

And then shortly after that, I bid out on another job, an RED mechanic, and, you know, I left the

machining and become an RED mechanic for about seven years.

I don't know if that answered your question or not, but that's what happened.

Member Valerio: So, I think my question is probably more for -- and I appreciate the explanation, but, going back to my question, and maybe I'm not phrasing it correctly, maybe for SC&A or for NIOSH, if the statement in the Evaluation Report is indicating that internal dose monitoring or bioassay was not required at Y-12 until 1989, and this incident occurred, you know, two, three years before that, isn't that considered internal monitoring?

And the next question would be, if there was a wound count, is that part of the internal monitoring? So, I just need clarification on that.

Mr. Hicks: Okay. On our bioassay records that we have, at the bottom of it has footnotes and it says -- it has A, I believe -- I don't have one handy, but it says, A, you know, internal monitoring not required.

And then if you watch on the bioassay records, when you get to 1989, they start recording that. And then, in 1999, they discovered they was monitoring for the wrong type of uranium. I think it was soluble and they discovered that they should have been monitoring for insoluble and that they should also have been doing routine fecals.

And that was about 1999 and 2000 they initiated that. And when they did, there was a whole bunch of workers come up contaminated from their fecal and they moved them out of the area.

And if they come up -- and when their count went back down, they was allowed to go back in. And if

they did that three times, they was restricted not to ever work in the area again.

Ms. Barrie: Steve, this is Terrie. Do you have -- in your records, were you -- do you have any urinalysis records in your file or wound counts in your file?

Mr. Hicks: No. I was not able to get the workman's comp records from Y-12. So, it's -- the only records I got is just the regular records. The work comp records, I have requested them twice and I cannot get them.

So, that's in my record. But in my records that I do have, it showed that when I went to body count, the reason that I didn't get to be monitored is that I didn't wash my hands, is what it said in my records that I have. And I actually have that record where it says I did not wash my hands.

Ms. Barrie: Okay. Thank you.

Mr. Hicks: And then on the dose record, also, you know, like I said, until 1989 it says internal monitoring not required. And then the document from DOE actually states that also. I believe it's the DOE internal standard.

And it says also in that standard, on page 99, I believe it is, that there's no way that DOE could convert the records -- I'm doing this from memory -- from MP, maximum permissible body something -- MPVE, I believe it was, to E50 -- I think it's E50 or H50 numbers, to analyze, you know, what kind of internal dose you got.

Dr. Taulbee: If I may, Loretta, answer your question a little bit here, but what we're going to prefer to do is to actually write this up to explain, both to the petitioners and to the Work Group as a whole,

because there are multiple forms of bioassay monitoring.

Many people refer to bioassay as just urine, but it's really encompassing in vivo counting, urinalysis, fecal samples, as well as wound. And all of those can be used to estimate internal doses here. And so, we will address all of this in a formal response here to the Work Group to make it more clear.

There was lots of changes in regulations and requirements from that standpoint, but workers during this time period were monitored for uranium -- or for urine bioassay, as well as in vivo in this time period.

There were some difficulties, but these are things that we can address in dose reconstruction. And we'll get into that in our response to the Work Group, as well as the petitioners.

Member Valerio: Thanks, Tim. I appreciate that. And I was just going -- I was reading that statement again where it actually addressed the soluble testing was begun. So, thank you.

Chair Field: And, Tim, you also indicated you're going to provide some information on Slide 11 and 12, right?

Dr. Taulbee: That is correct, yes.

Chair Field: Okay. Good. So, it sounds like NIOSH will be working -- a lot of work to do with development of the model and such.

As far as the Work Group goes, what do you think, as far as the recommendations from NIOSH and SC&A as far as what the next meeting should be and what activities that we should be expecting?

(Pause.)

Dr. Taulbee: I'm sorry, were you asking me there, Bill?

Chair Field: Lara or Bob.

Dr. Taulbee: Okay. Sorry.

Dr. Hughes: Okay. So, this is Lara. So, the NIOSH-proposed path forward is that, as Tim just indicated, that we will provide a formal response paper to the Work Group that hopefully would address the petitioner submissions, like the write-up that we received and the questions that were raised in this presentation.

So that would be my suggestion of path forward, and that would be in the form of a formal NIOSH response paper issued to the Work Group and the Board.

Chair Field: Okay. That sounds good.

Mr. Barton: I guess, from SC&A's perspective, so many of these issues are dependent on how that co-exposure model development turns out.

I know one thing that was asked, back in August 2019 during the original discussions of this, was whether additional worker interviews would be sought after. And the thought was, at that time, was that SC&A would go and look at the data that we have right now to see if there's any sort of reason we think that it's just infeasible to even try to perform a co-exposure model.

I think our review shows that, while we have a lot of questions, we did not find that smoking gun as of yet. But until we see these various facets of it, representation and completeness, it's tough for us.

And I don't know who we would necessarily pursue as far as workers going forward, but that was one

aspect of it that was sort of left. A lot of times during our SEC review we'll target certain workers as suggestions to interview via teleconference, but that was not necessarily part of our tasking.

But, as of right now, I don't know who -- again, who we would necessarily pursue in that end. But if there are ideas on that, we can certainly work to try to identify who we feel would be good candidates if there's a certain criteria.

But, again, until we see the analysis on representation, I don't know what group of workers that would necessarily be.

Mr. Hicks: I know one worker that you can approach. His name is [identifying information redacted] (phonetic). He was an RED mechanic that was in Beta 3. He just quoted a bunch of isotopes. You know, I worked there from 1987 to '89 with him, but the only one I could remember running was thallium. But he worked in there longer than I did. And me and him was talking the other day and he was quoting off quite a few of the isotopes that they run in Beta 3.

Chair Field: Okay. Well, I think that would be helpful.

I think we've covered a lot for the first meeting. The first meeting we get sort of caught up with what activities have been going on, and it was good to hear from Ms. Vinson and Mr. Hicks as far as -- and from Terrie as far as concerns that they have or things that they would appreciate the Working Group looking at. So I think we're well on our way to do those things.

So, I guess, at this point, it's a matter of waiting for responses back. And then, as the process goes toward the exposure models, planning a meeting

sometime down the road when we get some of those materials. Does that sound good?

Member Valerio: That sounds good to me, Dr. Field. Thank you.

Just a suggestion. If there's individuals, you know, that they may think may be good interview candidates, maybe emailing NIOSH with names and contact information.

Chair Field: That would be helpful.

Okay. So, Lara or Tim or Bob, do you have anything else?

Ms. Vinson: I have a question. This is Kathy Vinson.

Chair Field: Go ahead.

Ms. Vinson: I have a question about Loretta's previous statement. Do those names and contact information need to go to any particular party at NIOSH? Or if we just send it to NIOSH, it will get to the right place?

Dr. Taulbee: I actually don't know the answer to that. I believe there's a place to submit information -- go ahead, Bomber.

Mr. Rutherford: Yeah. I was going to say if you send that in to the normal route for the petitioner, through Josh Kinman, or you can send it directly to me, either way we'll make sure that they get to our Y-12 team and Dr. Hughes.

Ms. Vinson: Thank you.

Mr. Barton: Also, could I ask the Work Group that, if we do decide to proceed with more interviews of former workers, is that something that you want SC&A to be involved in? Because we were not

involved in the previous two -- I guess the two recent interviews that occurred just a few weeks ago.

Chair Field: Yeah. So, I'm not sure how many additional -- I think that's something that may be worthwhile to determine when we find out the number we have. We can decide at that time. Do we need a formal meeting just to get that tasked? I don't -- I'm not sure, perhaps we do.

Mr. Barton: In the past, it's really just been done informally across lines.

Chair Field: Okay. Yeah. Well, why don't we pursue that? I think that if there's, you know, sufficient numbers and interest, I think it would be well worth doing.

Anything else?

(No response.)

Adjourn

Chair Field: Okay. Well, I think we're good for today. Like I said, we have a lot -- we sure have a lot to go back through and review. I've learned a lot, and feel somewhat caught up, but I think there's a lot to -- and probably other members of the Working Group, have to go over and review and get updated on.

So, I appreciate everyone's presentation. Bob, thank you for that. I think that was an excellent presentation, as well as Lara. I couldn't ask for anything more. That was very helpful. Thank you so much.

I think we can adjourn. Okay. Thank you everyone.

(Whereupon, the above-entitled matter went off the

record at 2:43 p.m.)