UNITED STATES OF AMERICA

CENTERS FOR DISEASE CONTROL

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NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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110th MEETING

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THURSDAY
MARCH 24, 2016

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The meeting convened at 8:30 a.m., Eastern Time, in the Hilton Tampa Airport Westshore, 2225 N. Lois Avenue, Tampa, Florida, James M. Melius, Chairman, presiding.

PRESENT:

JAMES M. MELIUS, Chairman
HENRY ANDERSON, Member
JOSIE BEACH, Member
BRADLEY P. CLAWSON, Member
R. WILLIAM FIELD, Member
DAVID KOTELCHUCK, Member
JAMES E. LOCKEY, Member
WANDA I. MUNN, Member
DAVID B. RICHARDSON, Member
GENEVIEVE S. ROESSLER, Member
PHILLIP SCHOFIELD, Member*
LORETTA R. VALERIO, Member
PAUL L. ZIEMER, Member*
TED KATZ, Designated Federal Official

REGISTERED AND/OR PUBLIC COMMENT PARTICIPANTS

ADAMS, NANCY, NIOSH Contractor
AL-NABULSI, ISAF, DOE
CRAWFORD, FRANK, DOL
DARNELL, PETE, DCAS
FITZGERALD, JOE, SC&A
FROWISS, AL*
GRIFFON, MARK, DCAS Contractor
HAND, DONNA
HINNEFELD, STU, DCAS
LEWIS, GREG, DOE
NETON, JIM, DCAS
ROLFES, MARK, DCAS
RUTHERFORD, LAVON, DCAS
STIVER, JOHN, SC&A
TAULBEE, TIM, DCAS
WOLZ, GERALD*
WORTHINGTON, PATRICIA, DOE
ZINK, BRIAN*

*Participating via telephone

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(8:30 a.m.)

WELCOME AND INTRODUCTIONS

CHAIRMAN MELIUS: Okay. Good morning, everybody. And for this session we have three sites to talk about: INL, Savannah River and then Lawrence Livermore.

I think we accomplished all of our Board work issues yesterday so we'll probably be adjourning after Lawrence Livermore.

So we'll allow Mark to have one slide. Only kidding. Five minute presentation right now. A little longer than that, right? Yes.

So we'll start in, I guess, Josie, are you going to lead off on Idaho National Laboratory?

MR. KATZ: How about roll call? Let's do roll call first. Sorry to interrupt. I was waiting for permission to do roll call. So let's just run down the list and we'll address conflict of interest while we're at it.

(Roll call)

MR. KATZ: Thank you. Very good. Okay. And just a note for people that might be listening in. Please mute your phones, press star six if you don't have a mute button and *6 again to take it off of mute.

And the materials for today are present on the NIOSH website under the DCAS section, scheduled meetings, today's date, and all the materials are there. You can follow along and there's also Live Meeting which is, the address is listed on the agenda which is on the NIOSH website. Thanks. Go ahead, Josie.

IDAHO NATIONAL LAB SEC PETITION

MEMBER BEACH: Okay, good morning. I'm going to go ahead and do a brief report on Idaho National Labs. You see the Work Group there. All right, which one is it? It's got four words, yes, I'm hitting all of those and --

PARTICIPANT: Oh, I'm sorry I've set it up like that. Now try it.

MEMBER BEACH: Now we'll try it.

Okay, of the Work Group Members, Phil Schofield is our Chair. Josie Beach, Jim Melius, Dave Richardson, and Gen Roessler.

This gives you an idea of what activities we've been working on. If you'll note, November 10th, November 15th, and again on March 1st, we've been working on the Class Definition. We've also, I've got some dates in there for January 25 through the 28th. We did an initial Work Group, and SC&A onsite and NIOSH, not to leave them out, onsite data capture with interviews.

We also did some follow-up interviews on the 16th of February, again on the 23rd, 24th and then again on March 15th and 16th. But again, our focus has been on our Work Group meetings with the Class Definition.

So just to remind you, the Class Definition, I know we've read it a couple times. I'm going to go ahead and do that again.

The proposed Class Definition is, all employees of the Department of Energy, its

predecessor agencies and their contractors and subcontractors, who worked at the Idaho National Lab, INL, in Scoville, Idaho, and A, who were monitored for external radiation at the Idaho Chemical Processing Plant, CPP, with at least one film badge or TLD dosimeter from CPP between January 1st, 1963, and February 28th, 1970, or B, who were monitored for external radiation at INL and with at least one film badge or TLD between March 1st, 1970 and December 31st, 1974, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the Special Exposure Cohort.

Okay. So the Work Group has a recommendation. We've been struggling with this Class Definition for months. Our recommendation is that we have a consensus within the Work Group on B, but questions do still remain regarding data

adequacy and implementation on A, proceeded with provision B. We want to proceed with provision B while awaiting final resolution of A.

So just to go back, give you a quick -- most of you have this so I'm not going to reread it. So essentially we want to split it into the two parts.

And the proposed Class Definition would be all employees of the Department of Energy, its predecessor agencies and their contractors and subcontractors, who worked at the Idaho National Laboratories, INL, in Scoville, Idaho, and who were monitored for external radiation at INL with at least one film badge or TLD dosimeter between March 1st, 1970, and December 31st, 1974, for a number of work days aggregating at least 250 work days occurring either solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the Special Exposure Cohort.

Okay. We'd like to reserve Section A for employees who were monitored for external

radiation at Idaho Chemical Processing Plant, CPP, with at least one film badge or TLD dosimeter from CPP between January 1st, 1963, and February 28th, 1970.

Okay. So we are going to continue working. Most of you will remember that at our last conference call these were given to you, the issues that we have with that first Section A.

So I'm going to briefly go over them. Then I'm going to ask Tim. There's been some new information since I put together these slides.

The first one is the completeness and adequacy of the recently discovered records, the INL visitor cards, and temporary film badge reports.

NIOSH reported that it would be difficult to validate their completeness without a secondary index or database with which to compare. It involves extensive research on NIOSH's part to validate.

That was true up until about, what, a

week ago, Tim?

DR. TAULBEE: Last Wednesday.

MEMBER BEACH: Last Wednesday. So I'm going to let Tim come up. He'll let you know where we're at with that first bullet.

SAVANNAH RIVER SITE UPDATE

DR. TAULBEE: Thanks, Josie. As Josie mentioned earlier, we had a data capture last week out there on the site with SC&A.

And one of the things that I did while we were out there was look for additional monthly reports that could provide the secondary resource.

The previous group that we had, we only had monthly reports from 1963 through 1965 that would break out how many visitors and how many visitor badges we had. We presented that to the Work Group on March 1st during the meeting but we didn't have any data from 1966 through 1970 to do that verification.

But last week, last Wednesday we found them. And interestingly, in this box of monthly

reports these addendums, if you will, to those monthly reports, were stapled to the back of the folder for each of those months.

So that information had been captured, monthly reports from other sources, but here those reports that we had been following were available we just didn't know it until we found that box last week. And so we captured all of those secondary sources up through 1974 last week.

We haven't received them yet from the site. They're still undergoing ADC review, but I do expect to get them within the next week or two.

BOARD WORK SESSION

MEMBER BEACH: Thanks, Tim. So those will be available but still a couple of months down the road.

Okay. Our second issue, bullet number 2, was the reliance on subjective judgements based on weight of evidence to determine worker location where definitive location records are lacking.

NIOSH indicated that it's difficult to

prove a negative and that such judgements are common and supportable for dose reconstructions but not, in our opinion, the Work Group's, necessarily for SEC inclusion.

The Work Group remains concerned over such subjective criteria which to date have not been used in SEC Class Definitions that would be implemented by DOL.

The next question is third bullet, discrepancies in spelling of worker names on temporary badge records in the absence of other identifiers such as a Social Security number or a badge number. It's not clear whether it would be feasible to correct or accredit erroneous name entries so that no badge records are missed.

Now these were the three main ones. I had a whole list of different issues that I jotted down at our last Work Group meeting. To see that you could go into our portion of the transcript that was sent out.

Next steps. So the Class Definition is

the, of course, primary issue. NIOSH and SC&A are to, also we're doing a, reviewing an additional 30 claims submitted since May.

We started with 881. We got down to 18 issues. Those were pretty much cleared up at our last Work Group meeting.

We're going to actually start with 15. The 30 aren't all quite available yet. So instead of waiting for all 30 of the new claims to come through and be ready, we're going to have SC&A start with 15. NIOSH is going to start with the 15 and just keep rolling on those reviews to see how it all works out.

We also have temporary badge reports that need to be indexed. Tim can probably explain it better but they're very small cards. I know we've talked about it. To index those is going to take at least six to nine months.

And then SC&A is going to submit a draft proposal on how to validate and verify all those index cards that we're talking about. We're

looking at April 2016 for that.

So all these steps will take considerable amount of time to complete, several months for these documents to be cleared and uploaded into the SRDBs.

Ongoing review, INL is continuing. We're continuing with our data capture and interviews. SC&A is going to continue reviewing all INL early years, the burial grounds, CPP, central facilities.

And a traditional, just so you know, the traditional Evaluation Report is still ongoing while the SEC Class is being worked.

So that's all moving forward. And I leave you with questions. And I know Joe's here, John, Tim, if there's anything that I can't answer. Yes? And oh, yes, other Work Group Members, please. Push the button.

MEMBER ROESSLER: The button.

MEMBER BEACH: There you go.

MEMBER ROESSLER: This is on. I just

want to point out that those last few slides that Josie presented have to do with that reserve portion of the original petition.

Those are things that are going to take a good bit of time to do and that would be the A part of the petition.

What we're proposing today is the part of the petition that has Part B. These comments don't impact that. The Work Group felt that if we could go with Part B, which we all agreed on was ready to go, we could then get this moving. People who are waiting and waiting for these results could then be funded. And then it will take, you know, some amount of time to go with the other portion.

So what, I guess we maybe could have questions, but eventually I want introduce a motion that we accept this new Class Definition.

CHAIRMAN MELIUS: The motion actually is the Work Group report which Josie just made, so.

MEMBER ROESSLER: Okay.

CHAIRMAN MELIUS: Okay. Any other

questions? Yes, David?

(Off mic question)

MR. KATZ: Dave, you're mic's not on. Jim, why don't you just share your mic with Dave.

MR. LOCKEY: Yes.

MEMBER KOTELCHUCK: Thank you. Thank you. Roughly how many months would you estimate it will be until the second group becomes validated? You can't give a hard number but if you -- roughly?

MEMBER BEACH: Yes, I put the next step slide back up. We are interested in the temporary badge reports because we want to verify that we aren't missing anybody in that Class Definition. And it looks like six to nine months.

MEMBER KOTELCHUCK: Right.

MEMBER BEACH: There's a lot of them.

MEMBER KOTELCHUCK: So it would be roughly by the end of the year?

MEMBER BEACH: Yes. Not only do we want them in the SRDB but we also want SC&A to be

able validate that. So yes, it's a while.

MEMBER KOTELCHUCK: Okay. Thanks.

CHAIRMAN MELIUS: Yes. Can I just add I think it's -- this is a confusing situation. The fact that it's new information that keeps coming up. But remember, the first Class Definition requires badging within one area of CPP.

MEMBER BEACH: CPP.

CHAIRMAN MELIUS: The definition we're proposing requires badging within the site, basically. Anywhere on the site for during that time period. It is possible, though I think less likely that some of the people that would be badged and would then be eligible for the second one would have a -- might have a temporary badge.

And so to some extent the implementation of this definition may depend on that data.

MEMBER BEACH: That first part.

CHAIRMAN MELIUS: Yes, the first part and, well, getting all these temporary badges

entered and keyed. But we think that's probably sort of a small part of it unless it's, you know, less important than it is for the CPP portion. Until we see it, it's hard to tell. But it may not even be that important for the CPP. We know that to some extent it will, but to what extent there were people there.

So we felt comfortable, I think, there may be, I think, we've asked NIOSH to communicate with DOL that they need to be careful on turning down people during the time they weren't badged simply until all this data gets entered.

I'm not sure if the monthly reports are going to take care of that and I think they'll help. But you still don't know if they're --

MEMBER BEACH: Yes.

CHAIRMAN MELIUS: What's complete and so forth until we've looked at it, so it --

MEMBER BEACH: Well, and I didn't really speak to the implementation part on the DOL side but that's one of our concerns.

CHAIRMAN MELIUS: Yes, yes.

MEMBER BEACH: Huge concern.

CHAIRMAN MELIUS: Yes. But and I would add though that our understanding is that NIOSH and DOL and DOE have worked out the system so that it should be good access in terms of being able to locate people.

On the temporary badge one is where we're most concerned, is, was it the one person had eight different names or six different names entered?

MEMBER BEACH: Several different, yes, spellings.

CHAIRMAN MELIUS: Yes, with the spellings of their name.

MEMBER BEACH: Yes.

CHAIRMAN MELIUS: And first name mixed up with last, I mean, it was bad. And it's just nature of a sort of a casual sign in kind of system. But as I said, for this part I think we're comfortable going ahead, but it's not without some

complications.

And I think we asked for dates on the site. And it seems every time Tim and SC&A go out and visit the site they find something new, so you never know.

MEMBER BEACH: Correct. SC&A, anything to add or -- and you don't have to, just, okay, well. Do we need a second or -- okay.

MEMBER ZIEMER: Question here.

CHAIRMAN MELIUS: Yes, Paul. Go ahead.

MEMBER ZIEMER: Paul Ziemer. My question really, my main concern is the implementation history. So DOL now is going to have access to film badge data or TLD data? I mean, ordinarily they don't need that for an SEC. So they will have access to the monitoring data then, is that what you're saying?

DR. TAULBEE: This is Tim Taulbee. I think I can answer this. What will basically be happening is that when DOL requests employment

verification, at that time they will look for the badging information during that particular interval for SEC Class eligibility. So DOL won't be looking but DOE will be.

MEMBER ZIEMER: And DOE will confirm eligibility on that basis then?

DR. TAULBEE: That's my understanding, yes.

MEMBER ZIEMER: And I gather you've determined they're comfortable with it or semi-comfortable.

DR. TAULBEE: The feedback we've gotten from DOL is that this Part B Class, they are comfortable with.

MEMBER ZIEMER: Okay. Thank you.

CHAIRMAN MELIUS: They are more comfortable than we are probably, but at least some days, but.

MEMBER ZIEMER: Okay. I don't know if that's good or not.

CHAIRMAN MELIUS: Well, I think we'll

find out. I mean it -- a lot of this what we, how we go forward just like depends on this temporary badge situation. And until it gets entered and, you know, I think we're glad they found them, but it's a lot of work and until that can be looked at and verified it's going to be some uncertainty with this.

PARTICIPANT: There's still a lot of people that --

CHAIRMAN MELIUS: Yes, we'll get, obviously. Any other questions on the -- okay. We have a motion which, from the Work Group which is up there. No further comments? I don't know, are the petitioners on the line?

MR. KATZ: They're not.

CHAIRMAN MELIUS: They're not. Okay.

MR. KATZ: At least they didn't want to make comments.

CHAIRMAN MELIUS: Okay. Yes. Then go ahead, Ted and do roll call.

MR. KATZ: Yes. So, Dr. Anderson?

MEMBER ANDERSON: Yes.

MR. KATZ: Ms. Beach?

MEMBER BEACH: Yes.

MR. KATZ: Mr. Clawson's recused. Dr. Field?

MEMBER FIELD: Yes.

MR. KATZ: Dr. Kotelchuck?

MEMBER KOTELCHUCK: Yes.

MR. KATZ: Dr. Lemen is absent. I'll collect his vote. Dr. Lockey?

MEMBER LOCKEY: Yes.

MR. KATZ: Dr. Melius?

CHAIRMAN MELIUS: Yes.

MR. KATZ: Ms. Munn?

MEMBER MUNN: Yes.

MR. KATZ: Dr. Poston is absent. I'll collect his vote. 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 the majority has it and the motion passes.

CHAIRMAN MELIUS: And if you'll bear with me. The Advisory Board on Radiation Worker Health, the Board, has evaluated Special Exposure Cohort, SEC Petition 00219, concerning workers at the Idaho National Laboratory, INL, in Scoville, Idaho, under the statutory requirements established by the Energy Employees Occupational Illness Compensation Program Act of 2000 and incorporated into 42CFR, Section 8313.

The Board respectfully recommends that SEC status be afforded to accorded to, quotes, all employees at the Department of Energy and predecessor agencies and their contractors and subcontractors who worked at the Idaho National

Laboratory, INL, in Scoville, Idaho, and were monitored for external radiation at INL (e.g., at least one film badge or TLD dosimeter) during the period from March 1st, 1970 through December 31st, 1974, for a number of work days aggregating at least 250 work days occurring either solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the Special Exposure Cohort.

This recommendation is based on the following factors. Workers at this facility during the time period in question were involved in operations related to nuclear weapons production.

NIOSH's review of available monitoring data as well as available process and source term information for this facility found that NIOSH lacked the sufficient information to allow it to estimate with sufficient accuracy the potential internal doses which employees at this facility may

have been subjected. The Board concurs with this determination.

NIOSH also determined that health may have been endangered for these INL employees during the time period in question. The Board also concurs with this determination.

Based on these considerations and the discussions of March 23rd and 24th, 2016 Board meeting in Tampa, Florida, the Board recommends that this Class be added to the SEC.

Enclosed is the documentation from the Board meeting where this SEC Class was discussed. This documentation includes copies of the petition, the NIOSH review thereof, and related materials.

If any of these items are unavailable at this time, they will follow shortly.

Okay. Comments, questions? Okay.

CHAIRMAN MELIUS: Savannah River. Stu, I'm going to need your help.

DR. TAULBEE: Thank you, Dr. Melius.

I want to give an update, or actually I was asked to give an update on the Savannah River site SEC.

And in particular, what I'm going to focus on here in this presentation is the coworker models which is the main thing, the main activity that our team has been working on.

And this is regarding SEC-103. You may recall that a few years ago we, the ORAU Team, produced a coworker model and it's ORAUT-OTIB-81.

And this is a multi-radionuclide coworker model. There are eight radionuclides or combinations of radionuclides that we have in this particular model.

One of the things that changed during our deliberations about this coworker model was that the Work Group asked that NIOSH develop a coworker implementation guide. And this was something that Jim Neton developed and he presented here to the Board last summer and there's been much discussion about it.

Well, as I recall, the Board here wanted

to see some examples of the coworker models implementing, or using this implementation guide.

So we went back to the data here within this coworker model and started to apply all of the concepts and criteria that were in the implementation guide to demonstrate to the Board.

And so we started with number one and number five here that I bolded here, tritium and the exotic radionuclides, because those databases were the most complete at the time. And when I say complete, what we did for two, three, four, the plutonium uranium mixed fission products, is we used claimant data only. We didn't use the full set of data that was available.

And where we began to come into problems is with coworker strata. The Coworker Implementation Guide indicates that known differences and monitoring a work type should be stratified. And so by just using the claimant pool we didn't have the sufficient construction trades worker data for those other ones. We have to code

more data in order to do those.

But the americium, curium, californium, and thorium model, we had coded all of the data and we had sufficient construction trades as well as operations worker so we could develop the two models. The same with the tritium because of the large numbers of workers were monitored.

What we found when we went back to do that strata is that because these two models -- these two reports, Report 55 and Report 50, were done about a year and a half to two years apart.

The actual criteria we used to define a construction trades worker was slightly different between the two. So we needed to get these two definitions back to the same so that we would be, you know, able to present to you the exact same criteria of what we use to define.

And this had to do with some payroll numbers of roll four workers and roll five workers as well as there were certain, what I call roll two

workers, that were basically millwrights and did maintenance there within the facilities.

And we learned that from interviews that we had conducted out at the Savannah River site. So this is one of the major steps that we had to do with those two.

The next thing that we went to look at was these databases and how complete, or complete's not the right word here. How accurately the data was transcribed from hard copy into an electronic form.

And it requires, the Coworker Implementation Guide requires us to evaluate the dataset that we're going to be using in the model.

Well, late last, or last fall DCAS established an acceptable transcription error rate. And what we set that at was less than one percent error on critical fields.

These would be the analytical results that we would use to develop the actual intake model, and less than five percent error on all

critical and non-critical fields combined. This would be analytical results, their name, their payroll ID, the sample dates, sample type.

Because we're using the Time-weighted one person one statistic, these other criteria are not quite as important as that actual analytical result.

And so the overall team developed the sampling plan to evaluate the error rates within these parameters. And so we applied it to both the americium and the tritium datasets that we had.

So for the americium, we had 37,461 analytical results, or critical fields. And so we sampled 2,866 critical fields and compared to the hard copy for transcription errors.

And we found 38 critical field errors, or 1.33 percent. Since we established one percent as a proved criteria, this dataset failed.

Now because we're using the sampling of only 2866, there's a 95th percent confidence interval about that point estimate. And the

confidence interval was 0.96 to 1.79.

So it was fairly tight but it still failed. It didn't meet our one percent criteria for a critical field.

Within that same dataset there were about 229,000 non-critical fields. We sampled 16,000 fields because at the time we were doing kind of cluster sampling, if you will.

In that, we sampled all of the non-critical fields off of that same 2866 fields. We've since not done that anymore. We've done a true random sampling.

But in the non-critical fields we had 152 non-critical field errors, or an error rate of 0.93 percent, which passed because this was the one that we required the dataset to be -- have an error rate of less than five percent.

So because of the critical field the section failed. We did a hundred percent line by line comparison of the analytical results to the original hard copy records and then we resampled.

And you'll see that the number of analytical results increased. This was because some of the data coders had inadvertently taken individual samples and coded them as if they were recounts of the same sample. So we actually had more samples when they corrected this error that was originally found within that dataset.

So again we sampled 2864 critical fields, compared hard copy records and we found seven critical field errors, or 0.24 percent, with a confidence interval of 0.11 to 0.49. So in this case the americium, curium, californium, thorium dataset passed.

And I will say that all of this work, the initial discovery of the failure occurred late December. The hundred percent line by line verification took place in January and early February. And then the resampling was here at the end of February and validated.

So with regards to the tritium dataset we had 260,000 analytical results or critical

fields. We sampled 31 critical fields. We found nine critical field errors of 0.29 percent and so this dataset passed. Or at least that component of the dataset passed.

We had 780,000 non-critical field data points. And here's where we got to drop the sampling from that initial one. We stopped doing cluster and started true random on the non-critical fields. And we could go down to 624 because remember, we're looking for that less than five percent so it's much less stringent than that one percent on the critical fields.

We found three non-critical field errors, or 0.48 percent. So the whole tritium dataset passed.

So our current status is the exotic radionuclides, americium, curium, californium, thorium dataset has passed the QA check and the model using time-weighted one person one statistic is being developed.

The tritium dataset is actually

trailing the americium dataset, thank you. Pardon me. And the reason is that one of the indicators to identify the strata, for the tritium dataset we pulled in a lot of other datasets with work occupational information, work history type of information.

And one of those datasets failed the QA check and that was the mixed fission products. So as a result we've got to do a subsequent QA check of the strata component that was used in the tritium dataset independently of the other non-critical fields and that's just so that we get the strata right.

We anticipate delivering these two completed models to the SEC's Issues Work Group in July before the Advisory Board meeting in August.

And so that's our current status with the coworker models. As you can see we've been working on them. We did run into some difficulty and we've corrected that situation and are moving forward again. So with that I'll be happy to

answer any questions.

CHAIRMAN MELIUS: Questions for the Board? Brad?

MEMBER CLAWSON: Okay. I think I passed Tim my mic. So Tim, I'll be honest. If somebody was to look at all these stratas and everything else that you're looking at, you kind of have to make it fit.

And my thing is, is how long is it going to be before we have an approved coworker model? Because time is a big thing especially on Savannah River.

We have -- we're at this a couple of three years now. What time frame are we looking at before we'll be able to have something that we can give to SC&A to be able to start reviewing?

DR. TAULBEE: Well, as I indicated here in the last slide, these first two models will be ready to be given to SC&A in the SEC Issues Work Group so they can review our implementation of this coworker model.

The only difference from, you know, here's all eight of them. And these are the methods that we're using, number one and number five. So these are examples of how we're implementing the coworker model.

The other work will be continuing along there but SC&A can start looking at number one and five by the time we get to July, I believe. I believe we'll have that ready.

MEMBER CLAWSON: Okay. Appreciate it.

CHAIRMAN MELIUS: Are there other questions?

DR. TAULBEE: What Jim was just talking to me about, sorry, was we are already stratifying all of these models, okay. That was one of the things with the implementation guide.

There was one of the things we didn't do before on OTIB-81. It was not stratified. We're doing that now. And so the tritium and the exotic radionuclides we're doing now, so we'll be

at construction trades and we'll also be in operations.

MEMBER CLAWSON: Okay. Jim, I just had one other question. You said to the SEC worker but you're meaning the Savannah River worker or are you sending it to the SEC worker?

DR. TAULBEE: That's unclear to me to be quite honest. I imagine, I guess, it goes to both.

CHAIRMAN MELIUS: Both, both.

DR. TAULBEE: Okay.

CHAIRMAN MELIUS: They go to both.

MEMBER CLAWSON: Okay.

DR. TAULBEE: The coworker model as a whole came out under the SEC. The Draft Implementation Guide went to the SEC Issues Work Group. That was why. And they're the ones who asked for the examples. But we'll send it to both, no problem.

CHAIRMAN MELIUS: Yes. I would add, I talked to Stu yesterday. I am concerned that all

this work on the coworker models is going to take a long time.

It's not that anybody's at fault but it's just a lot of effort involved here and even aside from the glitches and data entry, it takes time and effort.

And so I asked Stu if he could sort of start looking at ways of evaluating some of these datasets a little bit earlier, rather than having to go through the whole data entry process and so forth.

I mean, so like, so one of the obvious ones is, do you stratify, you know, by construction versus production or some other parameter.

And is there going to be enough actual data to us over the time periods involved, density of the data to be able to support a reasonable coworker model?

Because if we have to go down the line all the time to the full coworker model to then judge it, so a site like Savannah River and probably

a site like INL, we're going to be, you know, we're talking many, many years.

And I'm not sure that's appropriate, given we have SEC requests and so forth and all of that.

I'd much rather see the effort going into coworker models that can be supported and will be supported, not that we'll be -- we'll have to reject.

So I think that would help move us along. We thought we originally would be SEC Work Group when we were going to sort of test the criteria with some models so this could be done more quickly.

But unfortunately we're at a point where we -- either models had already been done and the other having to go back didn't make sense. Tried to go forward but going forward takes time.

I think as we also talked, we're also at some sites now. Again, Savannah River and INL, where there's a lot of data. And in some ways

that's good but in other ways, because it justifies and supports a coworker model, at the same it makes it a lot of work.

DR. TAULBEE: It is.

CHAIRMAN MELIUS: So we'll see how they look through this. But we want to keep Savannah River in, I mean, obviously all these SEC sites moving along, so, with that, any other questions, follow-up? Yes, David?

MEMBER RICHARDSON: Thanks. I think I just need to get up to speed a little bit. So one question just to follow-up off after Dr. Melius's question about kind of the periods and completeness of the data.

So for a model for americium, for example.

DR. TAULBEE: Yes.

MEMBER RICHARDSON: Is that based on in vivo counting? Is that where the --

DR. TAULBEE: No, these are urinalysis. This is a trivalent urinalysis.

What they did was a separation of the urine. And they would extract off the uranium and neptunium and then the plutonium and then gross alpha count the remainder that came through.

And the remainder that came through was americium, curium, californium and thorium.

MEMBER RICHARDSON: So those are looked at as an aggregate, it's not -- even though it's cloning an americium model it's for something which is --

DR. TAULBEE: Right. That's correct.

MEMBER RICHARDSON: Okay.

DR. TAULBEE: And what we apply from a dose reconstruction standpoint, is we look at all those radionuclides in the organ of interest and whichever one results in the higher dose to that organ, that's the radionuclide that we assume and apply during dose reconstruction.

MEMBER RICHARDSON: And when you were talking about evaluating transcription error, is this off of the sites database, electronic database

of bioassay data?

DR. TAULBEE: No. These are the original log books where they would take a batch of urinalysis, of urine samples and so they were hand entered into the datasets.

MEMBER RICHARDSON: By whom though?

DR. TAULBEE: By the site, the site had --

MEMBER RICHARDSON: By the site.

DR. TAULBEE: The site had entered the data into the log books.

MEMBER RICHARDSON: That's what I, right.

DR. TAULBEE: And then we transcribed them into this dataset, an electronic dataset that we have done.

And that's what you're seeing here with our error evaluation, was we went back and sampled these particular data points within the electronic dataset and said, go back and look at the original hard copy record and does that match.

MEMBER RICHARDSON: But am I --

DR. TAULBEE: So did we get the transcription correct.

MEMBER RICHARDSON: Am I misremembering, doesn't the site have an electronic repository of bioassay results?

DR. TAULBEE: It only goes back to 1989. There is some that goes back prior to that but in this time period that we're looking at, is really going from the 1960s up through the 19, well, up through 1989.

1989 is when we started using the site's electronic data but at this time period we're using the original log books.

MEMBER RICHARDSON: Okay. So you were evaluating the key punching that you had contracted with the --

DR. TAULBEE: That's correct.

MEMBER RICHARDSON: Okay.

DR. TAULBEE: And that's the, there's actually, there's two, for every one of these

analytical results that we've got here that's actually double because there's a reported value and then there's an actual result that's reported.

And if you recall the individual bioassay cards that would say sometimes less than 0.1 or something like that or DPM per sample, we have the original log books, so if it's less than 0.1, say it's 0.05, we can enter that 0.05.

MEMBER RICHARDSON: Yes.

DR. TAULBEE: And so they had both the analytical, the reported result that went on the cards as less than 0.1, as well as the original data point of 0.005 or something like that. And so we have both of them. So in total we have about 17,000 americium, curium, californium bioassay samples.

MEMBER RICHARDSON: Yes. I swear I thought that there was a, at least a date of intake and some quantitative expression for the SRS prior to 1989, but maybe --

DR. TAULBEE: There is a, Tom LaBone had developed back when he worked there at the site,

people with known intakes. He did develop a database for that purpose.

MEMBER RICHARDSON: Yes.

DR. TAULBEE: As well as there's another system that they use to keep track of who was chelated and so forth. And we tapped those in order to take out the chelation samples because it's really not an accurate representation of the coworker. But these numbers are all where that data's been removed.

MEMBER RICHARDSON: And the tritium, similarly you re-key punched the tritium data or did you use the site's electronic data?

DR. TAULBEE: I believe we repunched but I'm not a hundred percent sure on that. I have to get clarification on that.

But the tritium in this particular case, there's many more than 260,000 tritium bioassay at the Savannah River site. This dataset came from claimant data that had been provided to us so we went through each of the, you know -- when

we did the dose reconstruction, we go through and they enter all of those bioassay for each of the claimants and that was the dataset that we used for tritium.

And because we have so many workers and so many samples we didn't feel like we needed to go back and try and get all tritium across the site. We felt that the, using OTIB-75 that the NOCTS claimant pool was sufficiently large for tritium and as you see, 260,000 tritium bioassays is quite significant.

MEMBER RICHARDSON: Yes, it's a lot of urine samples.

DR. TAULBEE: Yes.

CHAIRMAN MELIUS: It raises some other questions about the source of your sample.

MEMBER CLAWSON: I was wondering about the neptunium report. Where are we at on that?

DR. TAULBEE: The neptunium report just hit my desk for review last week or maybe it was the week before. It did finally clear from ADC

review out of Savannah River. We did get all of those issues cleared up.

And so I have it to review and I expect that in the next month or so we'll be able to provide that to the Work Group.

MEMBER CLAWSON: To the Work Group. Tim, you know, I'm going to be honest. Bringing it over from Mark, me and stuff like that, we have been through several evolutions with construction trades versus operations and none of those have really panned out.

So when we're talking about this coworker model, is it going to be for everyone or are we going to try to separate out again construction from operations?

DR. TAULBEE: What I indicated here on the second slide here, the third slide, is that we are separating them. We are breaking out construction trades. They will have their own model and operations will have their own model. So we are actually separating all of these

radionuclides between construction trades and non-construction trades.

MEMBER CLAWSON: Well, and that's -- I thought the last go around we had on this we didn't. We were having quite a bit of problem separating construction from operations. We didn't have a clear cut way. Has that improved? Is this what I'm hearing or?

DR. TAULBEE: Because, yes. We had --

MEMBER CLAWSON: We went a couple ways. We went the paycheck route, we went indicators, but we come to find out that a lot of the construction trades in the midst of things would come to Savannah River and we really didn't have a foolproof way of separating them.

DR. TAULBEE: I believe that we do. We've got the payroll ID numbers which separate out the construction trades in roll four and then in addition to that, when they did become DuPont workers, let's say they went from construction trades into DuPont, they then went from roll four

into roll two.

What's important for the coworker model is when the bioassay sample was submitted, what was their job classification?

And so that's what we're looking at here. It doesn't really matter if they were construction trades in 1960 and then became DuPont in 1970.

The bioassay sample in, say 1965, that's construction trades worker and we've got to tag it as that. Their latter designation would be DuPont and so people can switch between the two within the coworker model.

When they get into the 1970s and they're working for DuPont, you know, as an operator, they will no longer be, that bioassay they left then will no longer be considered a construction trades worker bioassay because the work is different.

MEMBER CLAWSON: Okay. And that's why we were getting into being able to follow these people through there. Now when you say their

designation and I'm not meaning construction or DuPont, their trade, you're talking like a welder or a operator or are you just separating it into the two?

DR. TAULBEE: Right now we're just separating into the two but we're retaining the data to where we could separate pipe fitters from electricians, et cetera, within the roll four and actually within roll two as far as their particular type of trade as well.

All we're proposing right now is to do the two, construction trades and non-construction trades. And once you look at these, you know, if there's further stratification we can certainly look at that.

MEMBER CLAWSON: Okay. I just -- I know that we've had a lot of problems with that and we've been down that road several times and I just, I was wanting to better understand. I appreciate that.

CHAIRMAN MELIUS: Brad, you can always

have a meeting of the Work Group, you know, a conference call to get updated and if that would be helpful for the Work Group. So that may, and because it has been a while and I think there's --

MEMBER CLAWSON: Well, this one's kind of interesting because the SEC requested this and so the Work Group really hasn't -- we haven't got lined out. And you're right, we probably may need to sit down with, and just have a -- come up to date with where we're at because we've got several outlying issues that need to be addressed.

CHAIRMAN MELIUS: Also a little more fair to Tim if we gave a little bit more warning. Then ORAU could be on the call too and I think it would be, might be more useful. And I don't think, you know, that's why things take a lot of time. But it would be a long meeting but it would be a way of getting up to date.

Any other Board Member questions?

MEMBER RICHARDSON: Yes, I have one more follow-up. Just again, I think I'm catching

up but so for the exotics, the 38,000 analytical results that are in the -- that's the data that have been keyed that are going to be the basis for the coworker models, is that right?

DR. TAULBEE: That's correct, yes.

MEMBER RICHARDSON: And those, am I right that those are analytical results that have been keyed for people who have filed a claim?

DR. TAULBEE: No. With the americium, curium, californium, there weren't enough of just claimant data and so we went back and got all of those log books and keyed them all.

MEMBER RICHARDSON: Okay. Yes.

DR. TAULBEE: This is the exotic radionuclide.

MEMBER RICHARDSON: Yes.

DR. TAULBEE: Everybody on the site was monitored for this particular radionuclide.

MEMBER RICHARDSON: Right. And very few people have a confirmed deposition on the site?

DR. TAULBEE: That's correct.

MEMBER RICHARDSON: Yes, okay. So that's -- you expanded the pool because I was just looking back at what I recall and it's 800 confirmed depositions, maybe for all intakes and of those, when you're looking at these exotics, it's a small number with which to make a coworker model.

DR. TAULBEE: That's correct, that's correct. But when you go back to the log books there's a lot of results.

MEMBER RICHARDSON: A lot of results and very few confirmed depositions.

DR. TAULBEE: Yes.

MEMBER RICHARDSON: Okay.

CHAIRMAN MELIUS: Any Board Members on the phone have questions?

MEMBER ZIEMER: I have none.

CHAIRMAN MELIUS: Okay. Okay, Tim, don't go away. We're going back to Idaho for a second.

DR. TAULBEE: Okay.

CHAIRMAN MELIUS: I think we messed up

with our Class Definition. But my understanding is that the way our Class Definition reads now it indicates that a person has to be badged for 250 days.

DR. TAULBEE: No. It should be a single badge.

CHAIRMAN MELIUS: Yes, a single badge. Well, it doesn't say that. It doesn't say that. That's why I was hesitating when I was reading. I didn't realize this until I started reading the letter.

DR. TAULBEE: No, it should be, okay.

CHAIRMAN MELIUS: So we have a correction we worked out.

DR. TAULBEE: Okay.

CHAIRMAN MELIUS: So, but I just want to make sure I was correct in my assumption because it --

DR. TAULBEE: No, it's a single badge.

CHAIRMAN MELIUS: That my memory hadn't failed me and so forth. And the Work Group

has responsibility for this, the letter we all reviewed and it wasn't until I read the letter into the, I noticed that, you know, there was something problematic.

So the new definition would read that all employees at Department of Energy, its predecessor agencies and their contractors and subcontractors, who worked at the Idaho National Laboratory, INL, Scoville, Idaho, removing the and, who were monitored for external radiation at INL (e.g., having at least one film badge or TLD dosimeter) during the period from March 1st, 1970 through December 31st, 1974, and who were employed for a number of work days aggregating at least 250 work days.

DR. TAULBEE: Yes.

CHAIRMAN MELIUS: So you have one badge and at least one badge.

DR. TAULBEE: Yes.

CHAIRMAN MELIUS: And 250 work days.

DR. TAULBEE: Yes, yes. And the

reason was, is that anywhere, if you were badged during that time period you could have gone into CPP and conducted work.

CHAIRMAN MELIUS: Yes, yes. And the badging --

DR. TAULBEE: Some of the badge --

CHAIRMAN MELIUS: Some of the badging record systems don't really have a duration to them. At least --

DR. TAULBEE: They do but during that time period there were some people that could have been badged annually.

CHAIRMAN MELIUS: Yes.

DR. TAULBEE: And so they only had the one badge.

CHAIRMAN MELIUS: Right.

DR. TAULBEE: So that's why.

CHAIRMAN MELIUS: Yes. Very good. Okay. So I think we need a motion for the Board to correct the Class Definition.

MEMBER BEACH: Jim, I'll go ahead and

make that motion.

CHAIRMAN MELIUS: Okay.

MEMBER BEACH: Good catch.

CHAIRMAN MELIUS: Yes. If you'll like, I can reread it again. Except Ted took it away from me already. But we'll do it. So --

(Off the record comment)

CHAIRMAN MELIUS: Okay. So, (e.g. comma, having at least having at least one film badge or TLD dosimeter) during the period from March 1st, 1970 through December 31st, 1974, and who were employed for a number of work days aggregating at least 250 work days, either solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the Special Exposure Cohort.

So we've got the time period captured and we've got the 250 days employed either at INL or at some other site which sort of complicates it, but, so.

So can we have a voice vote approving that change? All in favor say aye?

(Chorus of ayes)

CHAIRMAN MELIUS: Opposed?

MEMBER ZIEMER: Aye.

CHAIRMAN MELIUS: I'll take it the aye was to supporting the motion or were you opposing the motion?

(Whereupon, the above-entitled matter went off the record at 9:28 a.m. and resumed at 10:18 a.m.)

LAWRENCE LIVERMORE NATIONAL LAB SEC PETITION

CHAIRMAN MELIUS: So our final agenda item for this morning is the Lawrence Livermore National Laboratory SEC Petition.

And Mark Rolfes has been waiting very patiently so appreciate that. Welcome back. We haven't seen you for a while, so as I understand right, you've taken over for Sam Glover on this one.

MR. ROLFES: That's right.

CHAIRMAN MELIUS: So he handed it off

and disappeared to other pastures. Maybe not greener. So anyway, welcome back, Mark, and go ahead.

MR. ROLFES: Thank you. Good morning, everyone. Good morning members of the Advisory Board.

My name's Mark Rolfes. I'm a Health Physicist with the NIOSH Division of Compensation Analysis and Support.

Today I'm here to present to you the findings of Lawrence Livermore National Laboratory Special Exposure Cohort Evaluation.

The members of the ORAU Evaluation Team included Tim Adler, Bob Burns, Roger Halsey, Monica Harrison-Maples and Michael Kubiak.

The Special Exposure Cohort petition was received on October 7th, 2015, with a petitioner requested Class Definition of all DOE or DOE contractor employees who worked in any area at the Lawrence Livermore National Laboratory within the 7000 East Avenue location in Livermore,

California, or within the site 300 location in Tracy, California, from January 1st, 1975, through October 28th, 2014.

The petition qualified for evaluation on January 6th, 2015 and the basis for qualification was that information available to NIOSH did not provide evidence that the gross alpha in vitro bioassay measurements upon which some coworker analysis were based were capable of detecting all potential exposure scenarios of concern.

Previous SEC Classes for Livermore have been added. The first was SEC 92. The Class was added for January 1st, 1950, through December 31st, 1973, for employees who were monitored for radiation exposure.

The second SEC, 00163, the Class was expanded to include all employees for January 1st, 1950, through December 31st, 1973, eliminating the "who were monitored" distinction.

There were limited in vitro and in vivo

bioassay data pre-1974 which were insufficient to support a sufficiently accurate coworker fission intake model.

The proposed Class for the current SEC evaluation was all employees of the Department of Energy, its predecessor agencies and its contractors and subcontractors who worked in any area at the Lawrence Livermore National Laboratory in Livermore, California, during the period from January 1st, 1974, through December 31st, 1989, for a number of work days aggregating at least 250 work days, occurring solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the SEC.

Livermore was a covered facility from 1950 through present. Its original mission was the development of thermonuclear weapons and the diverse scientific and engineering research activities.

The current mission is scientific,

technical, and engineering capabilities with a special focus on national security.

Other past research activities include the testing of nuclear weapons life cycle, strategic defense research, arms control and treaty verification technologies, fusion research, atomic vapor laser isotope separation, AVLIS, magnetic fusion, atmospheric sciences, and commercial nuclear waste.

Lawrence Livermore National Laboratory is comprised of two sites. The 1.5 square mile main laboratory site, located at 7000 East Avenue in Livermore, California, and an 11 square mile explosive test site, also known as Site 300, located approximately 15 miles southeast of Livermore near Tracy, California.

The main laboratory consists of approximately 500 buildings and structures, approximately 50 of which of the operational buildings contain radiological materials areas.

NIOSH conducted onsite personnel

interviews along with the ORAU team members during January, February, April and September of 2015.

14 crafts and trades workers were interviewed, including electricians, health and safety technicians, machinists, maintenance workers, sheet metal workers, waste management, technicians and welders.

Also interviewed were Lawrence Livermore National Laboratory program staff, made up of engineering personnel, local security, hazardous waste, laser program personnel, nuclear chemistry, radiation protection, and weapons control and integration staff.

NIOSH and ORAU team conducted a total of ten week-long site visits between January and December of 2012 to review documents and select documents for this SEC evaluation.

NIOSH and ORAU staff also reviewed the materials accountability and control records. On October 1st, 2015, Lawrence Livermore National Laboratory released 1,400 documents and these

documents were reviewed by NIOSH and ORAU team through mid-December 2015.

This shows the number of previous dose reconstructions received from the Department of Labor. There were approximately 1,047 claims submitted for dose reconstruction from the Department of Labor.

The number of claims that were submitted for Energy Employees who worked during the period under evaluation from January 1st, 1974, through December 31st, 1989, was 942.

The number of dose reconstructions completed for Energy Employees who worked during the period under evaluation, this is the number of claims that were completed by NIOSH and submitted to the Department of Labor for final adjudication and approval, was 628.

The number of claims for which internal dosimetry records were obtained for the period under evaluation from 1974 through 1989 was 387.

And the number of claims for which

external dosimetry records were obtained for the period under evaluation was 757.

For the purposes of timeliness, NIOSH narrowed the focus or scope of the current evaluation to focus on the available data sufficiency and feasibility and conclusions as related to Building 251, for the period of January 1st, 1974 through December 31st, 1989.

NIOSH will continue to review and evaluate the entire Lawrence Livermore National Laboratory site for the period from January 1st 1974, through December 31st, 1995. It will proceed with issuing another evaluation report.

Building 251, the heavy element facility, was a major facility for supporting the U.S. Nuclear Testing Program and for basic research.

Building 251 had three main tasks under the Nuclear Testing Program. The first was the fabrication of nuclear tracers, the second was radiochemical analysis of bomb debris, and third

was the chemical research into transuranic radionuclides.

Building 251 had specialized equipment for manufacturing tracer sets. Most of the tracer sets used in the U.S. Nuclear Testing Program were manufactured in this building.

Separations on post-shot samples were performed in Building 252 after an initial sampling -- or initial sample processing at Building 151.

Building 251, Room 1235, contained the uranium tracer line, which was used to fabricate tracer sets containing uranium-233 and uranium-235.

The process included pressing oxide powders of uranium into pellets and soldering them into brass containers.

Waiting for my slide to change here. Okay. Lawrence Livermore National Laboratory uranium-233 operations occurred almost exclusively in Building 251. Livermore received U-233 metal and oxide from the Rocky Flats plant

for use in tracer applications.

Inventory documents also implied that U-233 was received from the Oak Ridge National Laboratory as well.

Tracer sets were fabricated for all U.S. nuclear testing overseen by Livermore and for some select sets of tests conducted and overseen by Los Alamos National Laboratory.

Bomb fraction tracer sets were used to help determine the fission and fusion yields in the post-shot analysis of nuclear test debris.

The tracer capsules were filled with a radioactive isotope that was not produced in the explosion. Lawrence Livermore National Laboratory fabricated these tracer sets in Building 251.

Tracer U-233 exposure entails alpha emissions as an internal dose concern and gamma radiation associated with the decay product impurities.

There was a site-wide routine in vitro

monitoring program which was accomplished through a combination of four procedures. The first was gross alpha urinalysis, which was the primary bioassay for Building 251 employees.

The second was a gross beta urinalysis program, also called mixed fission product analysis, which was added for Building 251 in 1984.

There was a plutonium urinalysis program which was secondary for Building 251 and finally a uranium urinalysis program which was uncommon for employees of Building 251.

Though the MAPPER database is no longer used by Lawrence Livermore National Laboratory, in vitro data contained within the MAPPER database span the 1974 through 1989 period of concern.

The MAPPER database contains monitoring data from the early 1960s through about 1995. It is believed to be complete from approximately the mid-1970s forward.

A fully identified version of the database was provided to NIOSH in 2015. The MAPPER

database contains over 35,000 records, approximately 16,100 of these records fall within the evaluation period of 1974 through 1989.

The results in MAPPER are predominately urinalysis results and there are roughly 350 fecal samples as well.

This table summarized the in vitro results for Building 251 during the SEC period in evaluation from 1974 through 1989. You can see the great majority of the urinalysis results are for gross alpha and then also for Pu-239, followed by mixed fission products and beta results.

There's very few uranium urinalysis that were collected in Building 251. There's only five here.

The available in vitro results do not indicate evidence of a routine in vitro monitoring program for uranium associated with Building 251. The MAPPER database reveals only 5 urinalysis for uranium associated with Building 251 from 1979 through 1989. All five of these results were

collected in 1980.

The urinalyses for uranium were analyzed using either fluorometric or phosphorescent measurements. The sample results therefore are expressed in terms of total uranium by mass.

There was routine in vitro monitoring for workers in Building 251 during 1974 through 1989 which focused on transuranic materials via gross alpha and plutonium urinalyses. The gross alpha procedure was essentially identical to the Los Alamos National Laboratory americium urinalysis procedure.

In addition to americium and plutonium, the procedure states that it also carried actinium, curium, neptunium and thorium, but there's no mention of uranium.

The Lawrence Livermore National Laboratory gross alpha procedure was a bismuth phosphate extraction with addition of sulfate to the solution prior to the bismuth phosphate

extraction. The sulfates kept the uranium in solution while allowing the plutonium to form an insoluble precipitate.

NIOSH cannot assume thorium decay products from U-233 or the U-232 impurities would have been sufficiently present in the gross alpha in vitro analysis, given the fact that it could have been removed during production.

Gross beta in vitro analysis, if performed, are deemed insufficient for U-233, given the lack of countable electron emissions from U-233 and U-232 and the fact that the beta emitting decay products cannot be assumed to have been present. The plutonium urinalysis procedure was specific for plutonium.

In vivo monitoring at Lawrence Livermore National Laboratory was accomplished via whole-body scanning and/or organ counting. Livermore has no electronic repository for in vivo monitoring data.

The official in vivo records for

Livermore personnel are in hard copies which are stored in personnel files.

For Building 251 workers, chest and lung counting was the most likely method of bioassay, given the wide variety of transuranic materials which were handled in Building 251.

Using Lawrence Livermore National Laboratories in vivo data to assign potential doses from the intakes of U-233 and U-232 would be highly uncertain, given that gamma emitting decay products cannot be assumed to have been present.

In vivo monitoring results were found for seven Livermore employees associated with Building 251 from 1974 through 1995. Though there were some whole-body counts, most of the monitoring was for lung scans as would be expected in a transuranic facility.

NOCTS in vivo monitoring found only two workers associated with Building 251 from 1974 through 1989. There were seven lung counts, 14 whole-body counts and one liver count.

NIOSH has no evidence of a comprehensive Lawrence Livermore National Laboratory repository for air monitoring data. NIOSH has very few results from within the 1974 through 1989 evaluation time and or from Building 251.

The 1980 DOE review of Building 251 operations noted excessive failure rates for the continuous air monitors used in various laboratories in Building 251 and recommended that Livermore vigorously pursue improving the air monitoring in the building.

A 1990 DOE Tiger Team assessment noted air monitors and air samplers did not appear to be strategically placed with respect to capturing representative samples for workers.

It was further noted that breathing zone monitors were not used at Livermore and continuous air monitor placement appeared to emphasize general room area monitoring, rather than representative work place monitoring.

Building 251 was surrounded by security fencing with access control by a controlled access by individual number booth, a CAIN booth.

NIOSH's first reference of CAIN booths is in March of 1980. 1980 log books indicate construction workers, electricians and site visitors were routinely present in the building during that time.

The machinist interviews indicate access controls were less stringent during the 1970s and it was more common for them to work in different facilities across the site.

Researchers and support staff routinely went back and forth between Building 151 and Building 251, as staff were needed.

A 1980 log book entry for Building 251 indicates that the north door of Building 251 was wedged open while construction was going on in the building, and visitors to Building 151 were going over to Building 251 without wearing dosimeters.

NIOSH data capture and interview

efforts have been unable to locate comprehensive historical access control records for the site for Building 251.

Information currently available to NIOSH contains insufficient access control information or records for Building 251 and insufficient general site worker movement data to accurately assess whether an Energy Employee or Class of employees did or did not potentially enter Building 251 during the period from 1974 through 1989.

NIOSH has determined that it has insufficient information to verify that the routine in vitro bioassay program for Building 251 workers, either via combinations of analyses for gross alpha in urine, gross beta in urine and plutonium in urine, was adequately sensitive for the detection of U-233 intakes during the period of 1974 through 1989.

Similarly, NIOSH has determined that photon-emitting decay products and contaminants

cannot be assumed to have been sufficiently present in the U-233 source term to verify that the routine and in vivo bioassay program for Building 251 workers was capable of detecting U-233 intakes during the period of 1974 through 1989.

Information available to NIOSH from multiple site inspections performed from 1980 to 1991 indicate deficiencies in Livermore's implementation of the air monitoring program in Building 251.

NIOSH has determined that the available air monitoring data from Building 251 may not be adequately representative of the worker breathing zones and are consequently not considered sufficient for Building 251 dose reconstruction during the period of 1974 through 1989.

Therefore, it is not feasible to estimate with sufficient accuracy the U-233 internal doses for Livermore workers in Building 251 during the period from January 1st, 1974, through December 31st, 1989.

Information currently available to NIOSH contains insufficient access control records for Building 251 and insufficient generals type worker data that would allow for NIOSH to accurately assess whether a Class of employees did or did not potentially enter Building 251 during the period under evaluation.

NIOSH therefore recommends the extension of the recommended Class to include all Lawrence Livermore National Laboratory workers during the period from January 1st, 1974, through December 31st, 1989.

NIOSH finds that it is feasible to reconstruct occupational medical dose for Lawrence Livermore National Laboratory employees with sufficient accuracy during the period from January 1st, 1974, through December 31st, 1989.

Consistent with the findings of NIOSH's 2010 evaluation of Lawrence Livermore National Laboratory Special Exposure Cohort Petition 00163, NIOSH finds the external dose for photon data and

neutron exposures can likely be reconstructed for all members of the evaluated Class for the period from January 1st, 1974, through December 31st, 1989.

NIOSH will continue to perform a full evaluation of external exposures during the period from 1974 through 1995.

For the purposes of timeliness, NIOSH is issuing this report covering available data sufficiency and feasibility conclusions to date, but will continue to review and evaluate internal and external exposures other than U-233 during the period from 1974 through 1989, and all internal and external exposures during the period of 1990 through 1995.

The evidence reviewed in this evaluation indicates that some workers in the Class have accumulated chronic radiation exposures through intakes of radionuclides, and direct exposure to radioactive materials, without exposure during a discreet incident likely to have

involved levels of exposure similarly high to those occurring during nuclear criticality incidents.

Consequently, NIOSH is specifying that health may have been endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this Class or in combination with work days within the parameters established for one or more other Classes of employees in the SEC.

The proposed Class once again is all employees of the Department of Energy, its predecessor agencies, and its contractors and subcontractors who worked in any area at the Lawrence Livermore National Laboratory in Livermore, California, during the period from January 1st, 1974, through December 31st, 1989, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other

Classes of the employees in the Special Exposure Cohort.

And at this time, if there are any questions?

CHAIRMAN MELIUS: Okay. Thank you, Mark. It's a very good presentation of a complicated site, so.

MR. ROLFES: Thank you.

CHAIRMAN MELIUS: Good. The, just for the sake of people on the phone, and so forth, I want to indicate first we'll hear Board questions about the report and about the presentation from Mark.

Then we'll give an opportunity for the petitioners to speak if they wish to make comments and so forth.

And then we'll come back and decide on how we will handle this and what actions the Board will take on this particular recommendation from NIOSH and on this report. So start with questions.

MEMBER CLAWSON: Yes, Mark. Looking

at, and I'm sorry you didn't have any numbers on your slides there, you only had so many fecal samples. Was there something that triggered, I think you had 12 or 13.

MR. ROLFES: There were 354 fecal samples collected from Building 251 staff. I'm not sure what would have prompted that but it probably would likely be an incident.

I wouldn't expect that they were routinely collecting samples, fecal samples, unless there was an elevated air monitoring result or, you know. Yes, and Stu indicated also, like a wound, contaminated wound puncture of the skin, so.

MEMBER CLAWSON: Okay. Thanks.

CHAIRMAN MELIUS: Other questions? Josie, I'm sorry.

MEMBER BEACH: No, that's okay. I was just wondering the cutoff date of, I actually have two questions, the first cutoff date of '89. It seemed like they still had some issues with

sampling and air monitoring. Why the '89 instead of moving it up into early '90s?

MR. ROLFES: The operations using uranium-233 were drastically reduced in that year or the year before and so that was the basis to use 1989 as the cutoff date because of the inventory and operations involving U-233 declining, so.

MEMBER BEACH: And no chance of residual?

MR. ROLFES: That is something that we're going to continue evaluating after '89, correct.

MEMBER BEACH: Okay. And then the '95 cutoff. I know the petitioners asked for 2014. Why only up to '95?

MR. ROLFES: I believe 1995, I would have to check back. I believe Building 251 closed right around that time period and I believe that was the basis for using 1995.

MEMBER BEACH: Okay. Thanks.

CHAIRMAN MELIUS: Other Board Member

questions? Board Members on the phone with questions? Paul?

MEMBER ZIEMER: Ziemer. I had no questions.

CHAIRMAN MELIUS: Okay. We have an opportunity for the petitioners if they wish to speak. And I believe at least one of the petitioners has submitted written comments which have been circulated to the Board Members.

But if petitioners wish to speak at this point?

MR. FROWISS: Yes.

CHAIRMAN MELIUS: Go ahead. Can you identify yourself?

PETITIONER COMMENT

MR. FROWISS: Yes. Thank you, Dr. Melius. This is Albert Frowiss, Sr., P.O. Box 909, Rancho Santa Fe, California, 92067.

And I can be reached at area 858-756-1494 or by email at frowiss@frowiss.org or my frowiss.org website.

For the past eight years I've been an advocate and authorized rep for 2,500 EEOICP cases, mostly Part B, but many Part E cases.

Of the 12 billion paid out since the program inception I have, since late 2008, enabled about 500 million of that share to my clients.

This is the first rodeo for me at being a petitioner and I appreciate all the fast action by your staff.

There is a correction I'd make to the third slide, about where it says the petitioner filed on October the 7th, 2015. It was actually October the 7th of 2014.

Well, I began this quest for a new SEC at a time when one of my cancer claimants was the [identifying information redacted]. It seems fortuitous timing and a chance that we came together.

Some of the members of his own family have been my clients, including his [identifying information redacted]. And they were mostly

struck down by cancer, as has been my client.

Before he passed he orchestrated my contact with [identifying information redacted], who also became my claimant and my co-petitioner on this SEC and he's helped me immensely on this.

So on behalf of my co-petitioner, along with a couple of hundred other patiently waiting claimants, I appreciate your quick speed in getting this to this stage today.

Of course I'd hoped that we'd be able to cover the period through at least 1994, which is the, you know, Sandia Lab facility across the street covers to '94.

And I noted that your air monitoring indicated insufficiencies through 1991, so I was puzzled probably by the same question that Josie had commented about.

Any event, I do urge that you approve the SEC as written today for the 1974 to '89 period and then just roughly follow-up with the balance of the studies through 1995.

I know you've got a lot of projects, big and small, like Savannah River Site, and I and my clients patiently or impatiently await progress on that as well.

So in summary, just want to thank you, the Board and staff, and hope that you make the motion to approve today and possibly give us a heads up on approximate target completion date for the study through 1995. Thank you.

CHAIRMAN MELIUS: Thank you, Mr. Frowiss. Does [identifying information redacted] wish to speak?

MR. FROWISS: I don't think he's on the line but I can --

CHAIRMAN MELIUS: Okay. [Identifying information redacted], if you're on the line and wish to say something you can, you're not required to, so. Okay. Thank you. Okay. Any further comments or questions from Board Members?

MEMBER RICHARDSON: Yes, Dave Richardson.

CHAIRMAN MELIUS: Yes.

MEMBER RICHARDSON: Just for clarification, you described the site as having 500 buildings and structures, 50 of them waste materials.

And I'm just trying to get a sense of Building 251 which is what you focused on today, the size of that building and maybe the number of workers that were typically within it relative to the size of the site.

MR. ROLFES: From my recollection there were several different additions to the heavy elements facility over time. Each, I believe, was considered, you know, a separate add-on.

As far as the full time staff in there, there were very few people that were in there full time. I believe there was one custodian in the building who had an office there. However, the majority of the building was laboratories that were used on an as needed basis.

BOARD WORK SESSION

CHAIRMAN MELIUS: Okay, David. Does that? Okay, thanks. Thank you, Mark. Any other questions? If not, I would entertain an action from the Board.

MEMBER CLAWSON: Move to accept.

MEMBER KOTELCHUCK: Second.

CHAIRMAN MELIUS: So moving to approve the NIOSH recommendation and to add the Class to that -- let's say we get the slide. Can we get the slide back up with the definition?

Thank you. Okay. So this is the Class that's been proposed by NIOSH. And then no further questions, I'll ask Ted to do a roll call.

MR. KATZ: Very good. Dr. Anderson?

DR. ANDERSON: Yes.

MR. KATZ: Ms. Beach?

MEMBER BEACH: Yes.

MR. KATZ: Mr. Clawson?

MEMBER CLAWSON: Yes.

MR. KATZ: Dr. Field?

MEMBER FIELD: Yes.

MR. KATZ: Dr. Kotelchuck?

MEMBER KOTELCHUCK: Yes.

MR. KATZ: And I'll have to collect an absentee vote from Dr. Lemen. Dr. Lockey? Oh, that's right, Dr. Lockey's absent. I have to collect his. Dr. Melius?

CHAIRMAN MELIUS: Yes.

MR. KATZ: Ms. Munn?

MEMBER MUNN: Yes.

MR. KATZ: And Dr. Posen's absent but he's also recused so no matter there. Dr. Richardson?

MEMBER RICHARDSON: Yes.

MR. KATZ: Dr. Roessler?

MEMBER ROESSLER: Yes.

MR. KATZ: And Mr. Schofield's recused. Ms. Valerio?

MEMBER VALERIO: Yes.

MR. KATZ: And Dr. Ziemer?

MEMBER ZIEMER: Yes.

MR. KATZ: So the majority has it. The

motion passes and I'll collect the absentee votes later on.

CHAIRMAN MELIUS: Okay. If you'll bear with me again. We have the right definition so we're set.

The Advisory Board on Radiation Worker Health, the Board has evaluated Special Exposure Cohort Petition 00221, concerning workers of the Lawrence Livermore National Laboratory in Livermore, California, under statutory requirements established by the Energy Employees Occupational Illness Compensation Program Act of 2000, incorporated to 42 CFR Section 8313.

The Board respectfully recommends that SEC status be accorded to, quote, all employees at the Department of Energy, its predecessor agencies and their contractors and subcontractors who worked in any area at the Lawrence Livermore National Laboratory in Livermore, California, during the period from January 1st, 1974, through December 31st, 1989, for a number of work days

aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other Classes of employees in the Special Exposure Cohort. Close quotes.

This recommendation is based on the following factors. Workers at the facility, this facility, during the time period in question were involved in operations related to nuclear weapons production.

NIOSH's review of available monitoring data as well as available process and source term information for this facility found that NIOSH lacked the sufficient information to allow it to estimate with sufficient accuracy, the potential internal doses from exposure to uranium-233 which employees working at this facility may have been subjected. The Board concurs with this determination.

NIOSH also determined that health may

have been endangered for these Lawrence Livermore National Laboratory employees during the time period in question. The Board also concurs with this determination.

Based on these considerations and the discussion at the March 23rd and 24th, 2016 Board meeting in Tampa, Florida, the Board recommends that this Class be added to the SEC.

Enclosed is the documentation from the Board meeting for this SEC Class was discussed. Documentation includes copies of the petition, the NIOSH review thereof and related materials. If any of these items are unavailable at this time they will follow shortly.

So, fine on that. Mark, I have some, I guess one or two questions for you. I'm trying to get a timetable for going forward and sort of what we need to do as a Board at this point in time. So it would be helpful or I might put Stu on the spot.

MR. HINNEFELD: Yes. Oh, well. You

know, some things you got to do yourself. This, there's -- we don't have a really firm schedule to complete this. Our resources who do this work are also involved in Hanford and other facilities as well.

And so we've not scheduled out the remainder. Certainly we know that we've done this much investigation, let's wrap this. You know, let's try to wrap this up. But we haven't got a schedule to be relied on yet.

CHAIRMAN MELIUS: So not even a ballpark?

MR. HINNEFELD: Probably not. I wouldn't expect anything before the end of the year, for sure. I mean, we could -- if the question is forming a Lawrence Livermore Work Group, you know, we can get information available to the Work Group to get them familiar with, you know, what we know and what we've had.

CHAIRMAN MELIUS: Yes, I think there are two questions there. One is forming a Work

Group and then I think at the same is it worthwhile having SC&A starting to become, you know, familiar with both this report and --

MR. HINNEFELD: Oh.

CHAIRMAN MELIUS: -- and Livermore and I think that would also --

MR. HINNEFELD: Sure. Well, all the information we have used and that we have obtained so far is in SRDB.

CHAIRMAN MELIUS: Yes.

MR. HINNEFELD: And so if they were tasked then they would have information they can be looking at.

CHAIRMAN MELIUS: Okay. Thank you. So if Board members concur that if we would, one is we need, would form a Work Group to cover the site and while that's being formed and set up we would have SC&A becoming familiar with the site including this report, with the prospect that before there's another report it's going to take a period time.

MR. FITZGERALD: Yes. Joe Fitzgerald. I just want to comment that I think I attended all but one site visit with Sam Glover at Livermore so I can say, very familiar with, you know, most of the interviews, all the documents, and, you know. We're pretty much up to speed on Livermore.

ADJOURN

CHAIRMAN MELIUS: Great, and that and so forth. So then what I will ask, and I'll circulate a note since we're missing some Board members, that we could form a Work Group there at that site. I think given the nature of the site I think security clearance is going to be probably a requirement for that Work Group. At least predominantly, so in terms of being able to get anything done and move forward.

So if that's reasonable with the group, so, okay. Good. Thank you. Thank you again, Mark and Stu. Anything else? No? You're smiling so there can't be anything else.

So that concludes our meeting for Number 110 and stay tuned in a couple months for Meeting 111.

MR. KATZ: Yes, thank you, everyone for a great meeting. Take care.

(Whereupon, the above-entitled matter went off the record at 10:57 a.m.)