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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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ARGONNE NATIONAL LABORATORY-WEST/
IDAHO NATIONAL LABORATORY WORK GROUP

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TUESDAY
AUGUST 2, 2016

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The Work Group convened in the Montreal Boardroom of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Phillip Schofield, Chairman, presiding.

PRESENT

PHILLIP SCHOFIELD, Chairman
JOSIE BEACH, Member
JAMES M. MELIUS, Member*
GENEVIEVE S. ROESSLER, Member

ALSO PRESENT

TED KATZ, Designated Federal Official
BOB BARTON, SC&A
HANS BEHLING, SC&A*
KATHY BEHLING, SC&A
RON BUCHANAN, SC&A*
YVONNE CARIGNAN, SC&A*
PETE DARNELL, DCAS
DOUGLAS FARVER, SC&A*
MITCH FINDLEY, ORAU Team
JOE FITZGERALD, SC&A*
BRIAN GLECKLER, ORAU Team*
JENNY LIN, HHS*
JOHN MAURO, SC&A*
JAMES NETON, DCAS
STEVE OSTROW, SC&A
JOHN STIVER, SC&A
TIM TAULBEE, DCAS

*Participating via telephone

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

(9:00 a.m.)

Welcome and Introduction

MR. KATZ: So, welcome, everybody. This is the Advisory Board on Radiation and Worker Health, INL/ANL-West Combined Work Group.

And we have almost everyone -- we have all the Board Members we are going to have in the room and then I will check on the line.

Dr. Melius, are you with us? Are you on mute? And Dr. Richardson is the other Member of this Work Group.

So, do we have Dr. Melius and Dr. Richardson on the line?

(No response.)

No. So, let's hang in there a little bit. Actually, we could do the rest of roll call. The Work Group Members are all -- none of them have conflicts with either of these sites. So, I will speak that for them and that will cover them. We will come back

around to see if Melius and Richardson have joined us.

(Roll call.)

MR. KATZ: Alright, then. So I will just remind folks on the phone to mute your phones except for when you are addressing the group. That will help with the audio.

And it's Tim, why don't we get started with you? Well, I mean, Phil, if you have anything, or Josie, you want to say up-front?

MEMBER BEACH: I don't think so.

MR. KATZ: Okay.

CHAIRMAN SCHOFIELD: Has the new order been posted to the website?

MR. KATZ: So, the agenda slightly revised. And, John, I guess, can speak to that briefly before Tim gets started, but it's not much different from the agenda on the website. And I would just also note that most of the materials that are being discussed are also posted on the website in PA-cleared form.

That's the NIOSH website. Go to the Board section, today's meeting, today's date, and you can pull up from there all of the documents that will be discussed.

And we do have a Live Meeting session for Board Members and SC&A staff who want to follow whatever might be posted there, if anybody is going to use it.

MEMBER BEACH: I guess the one thing that we can mention is the two-page site overview handout that we requested is not ready yet. So, it is on the agenda but it's not available at this time. So, that should be posted.

DR. TAULBEE: That's correct. I hope within the next month or so. I do apologize for that. Things got kind of hectic and we did not to get to that in a timely manner. So, I apologize for not providing that for this meeting.

MR. KATZ: John, do you just want to talk about the minor revisions to the agenda?

MR. STIVER: Yeah, sure. This is John Stiver. There have been a couple of changes to the agenda, just minor stuff.

Under the heading "SC&A White Papers and Discussion," bullet items two and three, which are reactor prioritization and the evaluation of cesium/strontium values and actinides, basically those two were combined for INL and ANL-West. Instead of having two separate discussions under different headings, it made more sense to streamline everything and just put them together. So, Steve Ostrow and Ron Buchanan will just kind of discuss that as one overall, overarching topic.

Let's see. Under the ANL-West, what had been number five on the list, Hans Behling's presentation on the general air sampling for internal dose assessment for FCF, we are bumping up to number one because Hans is going to have to leave early this afternoon and we wanted to make sure he had a chance to present.

And that's it.

MR. KATZ: And just a note on that, we will be adjourning by no later than 3:30 today for catching planes.

Okay, Tim.

White Paper on Temporary Badge Completeness

DR. TAULBEE: Alright. Well, thank you. The first item here on the agenda is to discuss our report on the completeness of the INL Chemical Processing Plant badges from the SEC Class Definition. At the last Board meeting, or at the last Work Group meeting, we discussed that the temporary badges, the Board has asked whether these were complete or not. And we believed that they were after we found the additional badge inserts back in January of this year at the site.

But at the time, we didn't have a way of verifying whether they were complete or not. We had some monthly reports that were not complete and others that were complete to where we could do a comparison.

So, back in March, I showed you a graph that had a 1963, 1964, and 1965 comparison. Fortunately, during SC&A's data capture in the middle of March, I was able to locate the other monthly reports that had the temporary badge information in them. So, with that additional information that we captured from the site, then we could go back to all the temporary badges that we captured and compare and see, do we have the same number of badges that they said they did: 400 in this month, do we have 400 to do some kind of independent verification?

And so that is the purpose of this first report that I have got up on here on the Live Meeting for you all to see.

And one of the things that I wanted to try and emphasize at least a little bit, with the Class Definition, the way we currently proposed it, was to have -- the requirement was to have one dosimetry badge at CPP between 1963 and March of 1970 -- or February 1970 -- and

then any badge on site from 1970, March 1970 through December 1974.

Now, the second part, the Board has already taken action on. So we are really just talking about this first part of January 1963 through February of 1970.

One of the reasons that we used that one badge -- or the primary reason we used the one-badge methodology was that somebody could be issued an annual TLD and only have been issued one badge and have gone to work at CPP. With these temporary badges, that wasn't the case. They never issued, during this time period, TLDs as temporary badges. They were still film through that time period. So the maximum wear period was the one month. Now, sometimes -- well, nobody went over a month, but you see up to a month in the records.

So, most of the badges are typically a few days, one or two days or a week type of time period within these temporary badges. So, in reality, to have worked at CPP for 250 days

and been monitored, because everybody had to be monitored going in there, we would need to be missing 12 badges for an individual -- 12 temporary badges, if you will.

So, based upon our follow-up here that I'll get to, I feel very confident that we are not missing anybody who worked at CPP for 250 days. And due to the completeness that I'll be pointing out to you here, I believe that we've got all of the temporary badges.

And to go through a little bit of a recap here, like on page four, this is one of the graphs I showed you of all the CPP regular badges and how well they matched on a monthly basis. The Figure 2 there that you see, the large drop in 1967 is, again, a transition from monthly film badges to TLDs. This is when they partitioned the workers who were heavily exposed remained on film, workers who were more lightly exposed transitioned to TLDs, and then eventually the whole site when to TLDs. But there you can see the very good agreement.

The graph below is the agreement between what's in the monthly reports and the TLD dosimetry. And, again, we see good agreement. These are on the regular badged workers at CPP.

Figure 4 here is the CX dosimetry. These are construction trades workers. These are people who entered out in a different date and were badged out of that same date going into CPP, but these are just construction workers. This is the CX dosimetry. And, again, you see good agreement between the monthly reports and the dosimetry reports. You can see the spike in the 1967 time period when there was a lot of renovation work going on and a lot more construction activity, and then it drops back down to kind of a normal level.

Figure 5 is the new graph. This is the temporary badges. This is what we've been working on. And when we're doing this, what we initially found was very good agreement up through 1967. 1968, 1969, and 1970 were

initially in good agreement. Now, what you see here is good agreement. What we found -- I'm sorry?

DR. NETON: I don't see Figure 5.

DR. TAULBEE: It should be down here at the bottom.

DR. NETON: You've got to scroll down.

DR. TAULBEE: Oh, I have it on the large screen. I'm sorry. I apologize. Is that better? Can everybody see that?

(Off the record comments.)

DR. TAULBEE: But what we learned was the temporary badge reports -- if you recall, there's two sets of information here. One is the temporary badge reports. These are the sheets with the names listed. And the second thing is what you guys saw when you were out there in January, is those little cards that we found.

And so the two are actually comprised -- the total temporary badges is what

we learned. When you add them together, the temporary badge reports appear to be mostly the Idaho Nuclear people only, and the temporary badge cards is everybody else. And so when you add them together, then we saw good agreement between the two.

So, you actually have to use both sets in order to evaluate the temporary badges for that CPP in that latter -- in that time period of 1968 through 1970.

Now, keep in mind, March of 1970, it's any badge onsite, but in that '68 to '70 time period, this is what we found, is that you actually have to sum up those two different report sets.

And so based upon this, we do feel that we have very good agreement and kind of complete dosimetry.

These other graphs are just an annual summary so that you can see, it's a little cleaner and you can see on an annual basis. In general, there is more dosimeters

listed in the printouts than what the monthly reports listed. And I think that's really more of an artifact of the reporting cut-off time periods when the temporary badges are on a daily basis, including weekends. People were working continuously, it was 24/7, and so some of these dosimeter reports made it in -- some of these dosimeters made it into the printouts and the dosimetry records but not into the monthly reports. That's why I think you see this small one percent type of difference between the monthly reports, where the dosimeters generally are larger. They had more data than what they reported. So, this last one here that I just pulled up is the temporary badge reports.

So, when you look at the totals, overall through the entire time period, the monthly reports from 1963 through 1970 indicated 83,698 badges. And what we've counted up between the regular dosimetry, the construction dosimetry, and these temporary

badge reports, which include people delivering for Coca-Cola or telephone, et cetera, we've got 85,405. So, we have got slightly more.

So, based upon our analysis, we believe that we have a complete set of the dosimetry for CPP during this time period.

Follow-up from Last Meeting – Discuss and Address Any Further Questions Regarding the 18 Cases

So, the next topic that we'll get into is the evaluation of cases, the 18 additional ones. And the point that I wanted to try and tie in here is, some people have indicated work at CPP and we weren't able to find them between 1963 and 1970, but some of these individuals we've found at CPP outside of this time period.

So, clearly, they worked at CPP, just not in the '63 to '70 time period that we're currently recommending. And so to do a full evaluation of some of them, it takes a lot more effort, and a lot of these temporary badges have not been coded yet. We went

through manually and looked for people within this time period. This information has not been indexed. The site is currently working on indexing that and now is probably a good time to relay this information to you all.

We talked to the sites the last week of June to see how they were progressing. If you recall, in March, I gave an update and they estimated it would take six to nine months. And so from March, then we are estimating the maximum that it would be November for them to have this completed, November/December.

Unfortunately, the site reported to me they didn't receive any of the money to start indexing this until the third week of June. So they didn't get the money transferred from DOE headquarters, Greg Lewis's group didn't get the money physically to the site to start coding. So they were geared up to do it, but what Craig reported to us, Craig Walker, our point-of-contact out there, is that they have started indexing, that they got the money.

All of those physical cards should be coded by October 1st, and at which time they will need additional money from Greg Lewis' group to start coding those individual temporary badge reports. So, how long it's going to take, I don't know. It's a money issue right now as far as them getting money to code this data. And it's coming from DOE Headquarters, which is under the program. So, that's something that you might want to take up with Greg Lewis.

MEMBER BEACH: So, this is a two-part process. They have the money to start the first part of it but they're going to have get the second part. So, really, we need to get that money moving forward so there's not a gap, possibly?

DR. TAULBEE: I would think so, but I'm not sure that that's going -- you are going to have to talk to Greg Lewis about that because it has to do with end-of-year money and carryover and that type of thing from the

October 1st fiscal year. And that was why they could only go up through October 1st. But I don't know what Greg's situation is from that standpoint.

MEMBER BEACH: I think we will see him next week, right?

MR. KATZ: Yes.

DR. TAULBEE: We certainly will.

MEMBER BEACH: Perfect.

MEMBER ROESSLER: So, a key in here is that, if one temporary badge is missing, it's not significant, because in order to comply with the 250-day minimum work period, they would have to have at least 12 badges.

DR. TAULBEE: They would have to have 12 missing. The reason that I mostly bring that up is that there were some discussion at the last Board meeting about misspellings of names and whether a record wasn't legible and that type of thing.

And so that's the main reason that I am bringing that up, is that if there is one

person who does happen to be misspelled and it does get missed, on a temporary badge only and they only had the one, they clearly weren't there 250 days. But I mean, obviously, we are going to try and do our best, and DOE is going to do their best, to make sure everything is indexed and everything is complete and so forth. A single badge missing I don't think is really significant, from that standpoint, along the temporary badges.

Now, in the TLD era, that could be, but those are all printout records. Those are all IDM coded. The spellings should be correct. They are something that was double-checked, that type of thing. So, that shouldn't be an issue along with the electronic records for the construction workers and for the regular operations folks.

These temporary workers who came in there occasionally, it could be an issue with the spelling. If you recall, the last time I pointed out, there was about 12 different name

variations for one individual. And so that's where that could become -- that's why I bring that up.

And so we're not really -- I don't believe we would be missing anybody that worked there for 250 days. Do I think we could end up, through a misspelling or something, missing somebody who had one badge there? Well, possibly. I couldn't 100 percent rule that out. So, just from what I've seen on the spellings.

MEMBER BEACH: Just so I have it clear, so they're indexing and then they are coding. Is that the two different variances?

DR. TAULBEE: I'm sorry. It's the same word.

MEMBER BEACH: Same word, okay.

DR. TAULBEE: There are two sets of data. One is the cards that you all saw physically that they were compiling together and putting into little groups to be scanned. That's the part that they are currently

indexing into their database.

MEMBER BEACH: Okay, scanning them. Okay.

DR. TAULBEE: They've already scanned them.

MEMBER BEACH: Okay.

DR. TAULBEE: The time period was the indexing, reading the names off of them and getting them into their system.

MEMBER BEACH: Yeah, that's a challenge.

DR. TAULBEE: That's the challenge. That's the hard part. I believe, as Bob pointed out in one of this reviews, there is S-numbers on many of these. These are security numbers. They can also be used. And I believe the site is also indexing them based upon those because that does really help with misspellings, is to just enter the number and then you get this person and so it is all indexed for the same person. So, that does help. That's the indexing that I'm talking

about. Indexing and coding I use interchangeably. It's the same thing.

Once they get done with those cards through October 1, that's the time period that they're going to move on to those temporary badge reports that you see.

MEMBER BEACH: Okay.

DR. TAULBEE: That's the part that they don't have funding for right now in order to do.

CHAIRMAN SCHOFIELD: Do you have any numbers for personnel, some of these people that have temporary badges that might have been sent for either in vivo or in vitro analysis?

DR. TAULBEE: We don't, until we get, really, the index done. When we get the indexing done and then we can do a comparison from it. That does kind of get into the question -- shoot, I just lost my train of thought -- on the bioassay, our current coding efforts.

Do you want to make an announcement

that Mitch is now here?

MR. KATZ: Yeah.

DR. TAULBEE: Okay.

MR. KATZ: Mitch Findley from ORAU has joined us.

DR. TAULBEE: Yes, thanks.

MR. KATZ: And no conflicts?

MR. FINDLEY: No.

MR. KATZ: No conflicts for either site, okay.

DR. TAULBEE: And so from the in vivo or in vitro data set, we are in the process of recoding that entire data set, re-indexing, if you will. That effort got underway at ORAU the third week of June. There was a significant lag as far as getting the database set up. It took a lot of effort but it's a very good product that's currently being done so that it can be reviewed easily and we have really good assurances of quality assurance on this data set.

To give an idea of the magnitude of

this effort, Phil, is there are estimated 181,000 lines to be entered. We have currently entered 26,000 in the past month and a half. So, we are underway, but our initial completion date is going to be around November 9th for the in vitro data set, and that looks like it is going to be about three months longer. So, that will be sometime in late spring, most likely, for that data set to be available. And that was something that Josie had mentioned to me just before we started, did I have an update on that database of when that would be available. My best guess right now is that it will be sometime in March, early March, that that would be available to you all.

At that point, hopefully DOE will also have this index done to answer the question that you just asked as to how many of these temporary badge people might have bioassay monitoring. We just don't know because there may not be any record, other than the bioassay, currently in any system to look

at from that standpoint.

CHAIRMAN SCHOFIELD: Okay, another question. I know it's been a practice at some facilities that if you have a contractor, say, come in and doing some work, their people aren't necessarily cleared. So, they use a person as an escort who is cleared but they may be the only one who's actually got a badge.

DR. TAULBEE: At CPP, everybody had to wear a badge coming in.

CHAIRMAN SCHOFIELD: Including the non-cleared.

DR. TAULBEE: Including the non-cleared, and the non-cleared were escorted. Interestingly, when you look at the physical cards, they're different colors, based upon whether they were cleared or not and at what level. And so when you physically look at them, you can't tell it in the SRDB because it's all black and white, but when you physically look at them you can tell who had clearances and who didn't. So that was how

they visually did that to make sure somebody was escorted along those lines. Everybody had a badge going in to CPP.

CHAIRMAN SCHOFIELD: Okay, thanks.

DR. TAULBEE: So, kind of in summary, with regards to the completeness, we have looked across both across the regular CPP, the CX group, which is CPP construction, and the CPP temporary badges. Overall, there's slightly two percent more badges identified that we have found than what is reported in the monthly badged -- or monthly reports.

The longest wear period is, again, approximately one month, with the vast majority of one day and one week amongst what we saw. Thus, a minimum of 12 badges would be needed for 250 days exposure. We are not requiring that. The goal in our SEC Class Definition was to cast the net wide to make sure we got everybody who had that potential. And so we recognize there are some people that don't work there 250 days but they would make it into the

Class, if they had a badge in that area.

The goal there, the primary goal, was that person who had that one TLD that actually started on that first day of the monitoring period and quit on that last one. Most people, even if they worked a year and one month, might have two, or should have two TLDs, along that type of line. So, that was our goal of the one-badge requirement was purely for the TLD. So, it really doesn't affect the temporary badges.

MR. STIVER: Tim, let me just interrupt you for one second just so I get it clear. So, even if a guy that just had one temporary badge and he can verify onsite employment for 250 days, he'd be in.

DR. TAULBEE: Yes.

MR. STIVER: Okay.

DR. TAULBEE: Yes. And again, we cast the net wide to make sure we didn't miss anybody. That was our goal, recognizing that we are including more people than clearly

worked there 250 days. So it was designed to be claimant-favorable along that line.

Again, TLDs were not issued as temporary badges during this time period. Thus, there's no way somebody could have worn a temporary badge for 250 days, a single one.

And with that, I will be happy to answer any questions that you guys might have.

MEMBER BEACH: I guess first impression from SC&A?

MR. BARTON: Yeah, and thank you for sending along the Excel file. That was really helpful just to kind of get an idea of what was done for this meeting.

My question is about the era, I guess, looking at the files, it was '68 to '70 where you had to add the count from the temporary badge report to the visitor cards. So, I guess, mechanistically, in the earlier time period, were they just throwing the visitor cards away once they created the temporary badge reports or did they keep those

as well?

DR. TAULBEE: It appears to me that they just -- the primary record was the temporary badge reports. I have not physically seen those cards but I don't know that I've searched for them directly from that standpoint.

MR. BARTON: Okay.

DR. TAULBEE: We did search for them in that latter time period, especially when we were looking for those three follow-up cases last January, which is how we discovered that. So, I don't know if those cards are actually still there or not. We have not looked for those.

But based upon what we see from the monthly reports, and some of the same names with the vendors, we see them on the temporary badge reports up through 1967. 1968 is when you begin to see those Coca-Cola guy, he disappears off of the temporary badge reports, and they are mostly INL or Idaho Nuclear

Corporation people or Allied Chemical Corporation and Argonne-West for some reason. You begin to not see the telephone guy, the Coca-Cola guy, but then you see them on those cards that we found. So that's where we saw that transition. It appears from around 1968.

MR. BARTON: Right. No, you have the reference in your report. It looks like it's dated 1966. I guess the policy of if you had a zero dose and you didn't already have an HP number, they kept the card but you didn't make it on the report. And that kind of transitioned, I guess, to where it was fully in effect by '68, it looks like.

DR. TAULBEE: That is my interpretation, yes.

MR. BARTON: Okay. And also just, as I was kind of looking through the data, how were the temporary badges, when you were counting them, physically off the report, like a "not in area" designation? Or if there wasn't actually a numerical result listed, was

that still counted in the listing? Like, you'll see some that it doesn't have a result and it just says NIA next to the person's name. Do you know if those were actually counted?

DR. TAULBEE: On the temporary badges?

MR. BARTON: On the temporary badge reports, when you're doing the tallies to compare against the monthly reports. Because I'm wondering if --

DR. TAULBEE: I remember seeing them more on the CPP dosimetry than on the temporary badge reports but --

MR. BARTON: I wonder if that would account for the fact that you sometimes see more temporary badges than --

DR. TAULBEE: That is possible.

MR. BARTON: Just a thought.

DR. TAULBEE: That is possible. I mean, in many cases, when we were counting these up -- well, let me just speak a little more to that.

When I counted some of the earlier ones, it was there's 25 names on this page and so I write that down and go on and kind of create a spreadsheet tallying from that standpoint. When you got to the temporary cards, it became really hard, really hard, because there wasn't a report date up at the top to go off of.

MR. BARTON: Just the days they worked?

DR. TAULBEE: It was just the days that they worked. And so you're looking at a handwritten date. And, okay, it looks like they were mostly in chronological order, but not always. So that's some of the variation I think you see.

That's part of why I wanted to look at the annual total, because you see one month to one month, there could be some slight variation.

MR. BARTON: Sure.

CHAIRMAN SCHOFIELD: I've got

another question on that. Say you have a temporary employee or a contractor, doesn't matter. They come in, say, in the month of June. Maybe they worked two or three days part of the month. Then you don't see them onsite for a while and then they come back. Maybe they are having to do, maybe like cement or something, they were letting it sit and cure and then they come back and do a few more days work and then they're offsite again. So, they can actually have been in three different times, four different times in one month.

I assume every time they came in they didn't give them a different badge, whether they held that temporary badge for them or would they give them a new badge each time they walked in?

DR. TAULBEE: No, they were given a new badge. They were given a new badge each time they came in. And so as long as we can identify one badge, and they have 250 days of DOL employment verification, they are part of

the Class. But they were given a different badge each time.

CHAIRMAN SCHOFIELD: Okay. That 250 days, are you counting the time they spent out at the site, INL, or just at CPP?

DR. TAULBEE: Employment, however DOL defines their current employment for employment in general. And in many cases, it's based upon they were working for a company and that company had a contract for a year or two years. And they might have only been on-site for a week during that entire time period and we have that one dosimeter, but there wasn't any other verification DOL could do as far as their employment, and, therefore, they said that this person worked there for two years, even though when you look at some of their Social Security Administration records, you can see that they were also working at other places because they were earning money for other companies during that time period. Their employment is verified as two years and they

have the one badge, they are part of the Class.

Like I said, our design was to cast the net wide.

CHAIRMAN SCHOFIELD: Okay. Jim, have you got any comments?

MR. KATZ: That's directed to Jim.

MEMBER MELIUS: I was on mute. I have no comments.

CHAIRMAN SCHOFIELD: Anybody from ORAU or SC&A who's on the phone, do you have any comments?

MR. BARTON: Well, I would say, based on the last meeting when we only had, I think it was, 66 of these reports to look at, and I think one of the big concerns was that we didn't have any of these monthly reports to look at in that latter period. So we really had no way to tell if we had a complete set of temporary records after '66. And about two weeks after that meeting, Tim was doing victory laps around the INL facility.

(Laughter.)

MR. BARTON: So, this was kind of what we were looking for. I think it's positive that overall we generally have more actual physical dosimeters or dosimetry reports than what is actually in the HP report. If it had gone in the other direction, that would be a concern.

And, obviously, when you start to look month-to-month there's some fluctuation, there will be a few months that have more reported in the health physics report than we actually have in hand, but then the next month, you have more dosimeters. And that's, I guess, kind of washed out in the uncertainty of when you actually report it, when the health physics office reported that badge being read or whatever their criteria was.

I think, at the end of the day, when you look at the entire big picture, what was it, two percent, two percent more badges in hand than what was actually reported by the health physics department over that entire

period. I see it as fairly positive, positive results.

MEMBER BEACH: So, I guess we need to talk about path forward, whether we need here -- I know we haven't looked at the temporary badges, correct? So, well, we've got the visitor badges --

DR. TAULBEE: Well, no, those are all the same, temporary and visitor are the same.

MEMBER BEACH: Temporary and visitor are one and the same?

DR. TAULBEE: Yeah, the site is currently working on coding those cards, which are temporary badges. And then they're going to be coding the temporary badge reports, the paper where the names are listed. So that's that distinction, but they're both the same thing. They're both temporary badges.

That was how, for the monthly reports, we had to add those two together in order to match what the monthly reports were.

And we did some cross-checking to make sure that they weren't listed on both, and they don't appear to be. It appears to be INC and everybody else.

MEMBER BEACH: I guess I'm looking for what does the Work Group need now? Do we need to do a sampling or what's the thought process?

MR. BARTON: Well, I mean, I think the validation of what was done here is sort of the gold standard for what we could do. As far as a sampling, I guess we could, for that earlier period where the visitor cards were all put on the temporary badge reports, we could do some sort of elevation on those earlier ones. But the latter ones, it's a little bit difficult because the process changed to where if you're on a sub-sub-subcontract, like the Coca-Cola guy, you probably aren't going to make it into that actual listing of temporary badges unless you had a positive result. I think it was pretty much based on if you

already had a health physics number.

DR. TAULBEE: Yeah.

MR. BARTON: If you already had a health physics number, then you made it on the report. If you didn't and you didn't have a positive dose, then they kept the card but they didn't put you in the main report.

So, in some ways, for those first couple of years when everybody who got a visitor card made it on the temporary badge report, you can kind of validate that those two match up reasonably well. But I'm not sure that really gets us any closer than we are right now, as far as validating that we have all the temporary records.

DR. TAULBEE: The temporary records that we have, those are all in the SRDB. That's how we tallied these up.

MR. BARTON: The visitor cards are not, though, right?

DR. TAULBEE: No, the visitor cards are, too.

MR. BARTON: Oh, they are, too?

DR. TAULBEE: Yeah, both are there. The site is taking those and currently indexing them.

MR. BARTON: Oh, for claims, individual claims.

DR. TAULBEE: For individual claims. We have not done that. We've just simply tallied the numbers.

MR. BARTON: Right.

Analysis on Additional 32 Claims Since Last Summer. Evaluation of New Claims Filed Since the Summer of 2015 for Idaho National Laboratory

DR. TAULBEE: Now, in the evaluation of additional claims, which we can go on next, it's kind of the next topic, we went through and searched those reports. But that's a manual search, if you're looking for a name and going through, and it's very tedious and time-consuming. But we can certainly go on to that report, if that is what you want to do next.

MEMBER BEACH: Sure. Seems reasonable.

DR. TAULBEE: Okay. I think getting both of those two pieces together then for you all to discuss I think would be beneficial.

Okay, give me just a second here to look that one up. Okay, I'm going to use the non-PA-cleared version of the report here. So, people, please be cautious and let's refer to them as claim number instead of name. I'm telling that to myself as well here. And I guess the first thing I'll bring us up here to is kind an overview of what was done.

Back in March, I believe it was Dr. Melius asked, we had evaluated 881 claims and he asked what about the claims that have come in since then. And so Bob and Mitch both searched Optis and found that there were 32 additional claims that came in that we could evaluate and add to that 881 that had previously been done.

And so that was done. We went through the records. Now, unfortunately, only 22 of these had complete dosimetry records at

the time when we were doing this report. So, some of them are new claims and we haven't gotten the full DOE response yet. You'll notice that with some of the higher claim numbers in this particular file. So these would be claims above number 20; 22 through 32 is where I believe most of those fall.

And so we went through and did the same thing with the 881 with these additional 32, and what we found that was that we could continue to identify individuals, whether they worked at CPP or not. And pretty much for everybody. I won't go through each one of them.

There was one claim that was considered indeterminate due to a lack of individual dosimetry results. At this time, we hadn't gotten individual dosimeter results from the site. The individual clearly indicated that he worked at CPP. And in going through, I believe, as Bob pointed out in his report, the individual worked at CPP in the 1980s time

period. There are multiple CPP badges that confirm from his CATI as well. I went through some the early CPP temporary badge reports and I actually found him in 1959 working at CPP as well. So, we found him in 1959 and we found him in the 1980s. During the 1960s, I located him at other areas.

Live Meeting is not public, correct?

MR. KATZ: Correct.

DR. TAULBEE: Okay, so I'll pop up. Here is one. This is the particular individual. This is 1958 out at MTR. This is a worker who bounced around to different areas. In 1965, he was at Test Area North. And so we do see temporary badges for him in other locations during his work career, but we don't see him at CPP from 1963 through 1970.

MR. BARTON: Tim, which case are we on here?

DR. TAULBEE: Let me pull that up again. I apologize. This is claim number 21 -- or case number 21.

And, you know, we went through a pretty exhaustive search of the CPP dosimetry to see if he was there and do not find him.

Now, based upon this individual only appearing on multiple temporary badge reports, I believe he's probably going to end up as part of the Class once all the temporary badge reports in the cards are coded, because he pops up at different time periods in different areas. And so during the 1970 to 1974 time period, he could have worked at CPP. And if he pops up on any temporary badge report, he will be part of the Class, is how that particular time period works.

So, he could have been exposed at CPP in that 1970 through 1974 period but then badged at MTR and wore that into CPP. So, that is already included as part of the Class Definition. But until those temporary cards are coded and those temporary badge reports are done, I don't think we are going to find this individual.

So, that's one of the anomalies. So, it's kind of indeterminate at this time. But considering all of his dosimetries on temporary badges that I've seen, it appears that he did go into areas at times but his routine work was not generally in the area.

The only other individual that is still outstanding that I want to talk about briefly here is the same individual we identified back in March that we had difficulty with. And this is an individual -- let me get the number here. Well, actually he's not part of that group.

MEMBER BEACH: Wasn't he part of the original?

DR. TAULBEE: Yeah, part of the individual one. This is the one who has a whole body count designated as CPP. And we have looked for this individual throughout the temporary badge reports for CPP and we do not find him on there in that time period. We do see him out at SPERT, at MTR, at ETR, from 1963

through 1966.

I have really no explanation as to why the whole body count says CPP. To me, it should have said CFA, because the individual had follow-up, clearly routinely worked at Central Facilities. If you recall, this was a [identifying information] who worked out of the Central Facilities, who would go into areas occasionally and then be badged. Like I said, we have seen him on temporary badge reports, just not CPP temporary badge reports.

And so why his whole body count lists CPP, I don't have an explanation. Is it a typo? I don't know. There wasn't a whole body counter at CPP. The whole body counting was at CF, at Central Facilities. So, was it somebody writing down something incorrectly? Was he planning to go to CPP at some point and just never did? We don't know.

CHAIRMAN SCHOFIELD: But the possibility that he might have actually been exposed to something, potentially, when he was

at CPP and when they were looking at something that they wanted done, work for him to do, and maybe they discovered they had some loose contamination or something in that particular area.

DR. TAULBEE: He should still be showing up on the temporary badge reports. Everybody going into CPP had to be badged.

CHAIRMAN SCHOFIELD: But he has bioassay there.

DR. TAULBEE: He has bioassay from other areas, too.

CHAIRMAN SCHOFIELD: Right, but how can you discount when it says CPP for this individual, how can you discount that?

DR. TAULBEE: I can't.

MEMBER BEACH: And I don't think he said he was. He was just trying to figure out the puzzle.

DR. TAULBEE: We have looked through all of the CPP temporary badge reports. We believe we have a complete set of the CPP badge

reports. We do not see this individual on there.

CHAIRMAN SCHOFIELD: But it is possible that his badge fell through the cracks somehow, right?

DR. TAULBEE: Yes.

CHAIRMAN SCHOFIELD: Okay.

DR. TAULBEE: Okay, we will put it that way. Now, did he work 250 days in there? No.

CHAIRMAN SCHOFIELD: Right.

DR. TAULBEE: There is no way that he worked 250 days in there without us seeing him. We cast the net wide. So, is there a misspelling? Did this one actually get missed? I don't know. Is there a typo in his whole body count? Possible.

I mean, Central Facilities is where he worked. That's definite. That's clear from his work description and other records. His primary work location was Central Facilities. And he went to other areas, individually, and

like I said, we see him on -- oh, gosh, there was 13 to 15 temporary badge reports in other areas that he appears on. So we know he was doing a job out at SPERT. We know he was doing a job at MTR. We know he was doing a job at ETR. We have no indication -- by the way, all of those areas, he has got multiple temporary badges at, but he's not on CPP.

MR. BARTON: You know, interesting to that specific case, too, is a lot of times they would give you what is called an in vivo questionnaire. And basically they'd ask you, you know, where were you working? Where have you been the past few months, years, whatever it may be? And I think he had marked down four years at CFA and he hadn't listed SPERT or MTR either. So it might be just the fact that for a day or two, he would be headed out here, here, and here to look at possibly new construction happening so he could do his draft work.

So, I mean, the fact that it doesn't

list CPP, it doesn't say he didn't go there, but it also indicates to me he probably wasn't there for a full year.

So, there was that. And that exposure questionnaire was associated with that in vivo count that was listed as CPP. So when he actually filled out the form, he put in CFA. But on the actual in vivo count, it was written CPP.

It's one of those confounding ones where we don't really have an answer whether he actually entered there or not. It's certainly possible, like you said.

DR. TAULBEE: So, that is the only claim that we have found where we have this problem, out of the 913 that we've looked at. So, 99.9 percent we've been able to resolve, and this individual, 0.1 percent, we have not.

MR. STIVER: Yet the weight of evidence would surely indicate that he probably wasn't at CPP for a whole year.

DR. TAULBEE: So, that's kind of a

summary. I didn't go through each individual claim. I mean, you guys have that in the report, both ours and SC&A's, Bob's. I'll give the credit here to both Mitch and Bob here. You both did the lion's share of the work here -- all of the work, really. So, I think they did an outstanding job of coming to resolution on virtually everybody.

So, part of the agenda here is for us to give our interpretation and then Bob to give his.

Discussions or Concerns the Work Group Has With Regards to Sufficiency of the Data

MR. BARTON: If it's amenable to the Work Group, we have eight observations associated with these. One of them we just quickly discussed, which is the one where it's indeterminate at this time whether we can place them in CPP. And it's largely going to be reliant on when those temporary and visitor cards get coded so that we can more directly associate him with any temporary badges there.

Like I said, the position we're in now is basically a line-by-line search, or going from visitor card to visitor card, since we have those.

But anyway, let me -- I took our report, and I'm actually going to usurp Live Meeting here.

DR. TAULBEE: Let me disable mine, if I can.

MR. KATZ: You should be able to just take over.

MR. BARTON: No, I've got it now. Alright. So, this one, this one was Case 3. If you have the White Paper in front of you, that was discussed on page 14, Section 2.3. And it was the subject of Observation 1, which I'll just read in here now.

"The EE indicated several times that they would conduct tours of uncleared personnel through CPP and has evidence of assignment to CPP in 1964 and 1974."

So, basically the location file

cards indicated they were at CPP in '64 and '74. And while we found records in '74, we did not find monitoring records in '64. And this is one of those times when we had to go back and manually search through to capture temporary badges. And we turned up multiple entries for the claimant.

Basically, the observation is we didn't know why these records were not included in the DOE response. And it was possible the claim was researched utilizing the efficiency process, but it's also clear it could be because -- and when I say we couldn't find them, we couldn't find them in the NOCTS records that we got from DOE. We could find them in the captured records that NIOSH has captured from the site.

So, that was kind of our question. That's why it's an observation. It's probably more likely that it wasn't an efficiency measure but rather than those visitor cards and temporary badge reports hadn't been coded yet

so DOE didn't have a way to directly link this person to those records.

So, once those get coded, it'll probably clear up that one. What you're seeing right here is the location file card, and we circled the area code; 5 and 55 are both for CPP.

MEMBER BEACH: I'm not seeing anything right now.

MR. KATZ: Why don't you just close out your Live Meeting?

MR. BARTON: If you try right clicking and maybe remove and then share.

DR. TAULBEE: Okay.

(Simultaneous speaking.)

MR. STIVER: There you go.

DR. TAULBEE: There we go. Sorry, Bob.

MR. BARTON: Alright. So, what's in front of you right now is this person's location file card, and we can see the two entries there that indicated 1964 and 1974.

And again, we couldn't fine '64 yet. But hopefully when all those temporary badges get coded and uploaded so that DOE, when they -- if they were to process this claim today, if they get all their monitoring workers, they would be able to identify that worker. We'll just have to wait and see.

This figure is actually from Tim's report. I just lifted it right out. And this was a temporary badge report that they found for the individual, actually in 1966, which wasn't even indicated on the location file card. So it kind of shows you that while those location file cards are very useful, they are not exactly complete either.

So, that was Observation 1. Observation 2 was for Case Number 18, and this is in SC&A's White Paper, Section 2.18, page 24. And I'll read the observation.

"While the majority of EE's work appears related to reactor operations, the EE does describe having to go into CPP to clean up

spills on at least a few occasions. One such occasion resulted in the claimant being restricted from radiation work. While it is apparent that he was monitored externally throughout the SEC period, individual dosimeter information was lacking."

So, basically, that means we have information that they -- annual summaries, essentially, that they were monitored externally. But if you don't have the individual records, you can't tell from that where they actually were.

So what we're looking at here is another location file card. This one is actually from the early '50s. And it's not circled, but you see up here, the second entry there is for 5. That's CPP. Four is MTR, I believe.

Interestingly, and I'm going to have another observation about this later, you see one of these area codes is "all." Basically, a site-wide badge, I guess, apparently. And I've

seen that before in the 1950s. And one question is, you know, we need to make sure when they stopped that practice, going to one badge/one area. Because that's very important to the SEC Class Definition.

Here is the other half of the locator file card for this individual. There's really no indication of Chemical Processing Plant in that one.

And then here are the annual summaries for this worker starting in, you see, 1956. And I guess the point here is the temporary badges that we do have were outside the SEC period. It was the late '50s and I think 1975. But what I found curious is that in the CATI statement they said that when they went in to clean up the spill, they got zapped to the point that they were restricted from radiation duty.

Now, those years in which it could be what he's talking about, going in and cleaning up spills and getting restricted,

those years actually list zero as the annual doses. And the period '63 all the way through the SEC period, those are all zero, too.

So, it's just a question of when was this guy actually here? And you can see at the bottom here, the claimant had temporary badges in '56, '75 and '76. They are all zero in the annual summaries.

The location file card indicated TAN beginning in 1966, but from '63 to '65, we really don't know where that individual was because we don't have the individual dosimetry logs. We only have these annual summaries.

And yet you can see that there are positive doses in that '63 to '65 period. So it's possible that that person might have entered, that is what he was talking about with the spills. But we don't know at this point because of sort of the efficiency -- this is the efficiency method, but you only get the annual summaries. That is something that I think changed October of last year, that they

have to really go in and give us everything they've got and that these annual summaries are not appropriate.

Observation 3 was the one we just discussed. NIOSH and SC&A are in complete agreement. I think this is the statement. Yeah, I will just read it out of your report there, Tim.

It's in summary draft status at the time of this report. It's not finalized. There is indication of work at CPP because, quote from the claimant, there was a piece of equipment that needed to be serviced. He had to go to it and service it in that area. The DOE monitoring records and medical records indicate Central Facilities was the primary work location.

And Figure 30, which was right here, as we can see, indicated INL '61 through '65, which is part of that SEC period. But, again, since we don't have individual dosimeters to determine where this person was, at this time -

- this is the concluding statement from the NIOSH White Paper -- at this time, the determination for inclusion in the SEC Class is indeterminate. And that's definitely one we agree on. And as we just discussed that, so I'm not sure we need to go back and do it.

So, I will move on to Observation 4, which was for Case 24. And that can be found in Section 2.4, page 28 of 41.

The LOC for the claimant indicates that he was assigned to all areas from 1970 to 1974. This is a broad example of the badging policies at INL changing in 1970 from one badge/one area to one badge/multiple areas.

It's not clear if any all-area badges were issued in that earlier period, but I'll also add that SC&A has found no evidence that they were, that we found a claimant that had an all-area badge, because that would be very important.

MEMBER BEACH: As early as when?

MR. BARTON: Well, for the 1963 to

1973 period where you need a CPP badge.

MEMBER BEACH: Well, there's one -- and I was just looking, because I knew I'd seen all badges. On Tim's report, there is one --

DR. TAULBEE: In the 1950s.

MEMBER BEACH: In '57, yeah.

MR. BARTON: At some point, they must have switched over.

DR. TAULBEE: In the earlier years, I have seen some people badged out of Central as all areas in the 1950s. But like Bob was saying, I have not seen that in the 1960s.

MEMBER BEACH: None at all, yeah.

DR. TAULBEE: Honestly, I can't 100 percent rule it out. I just haven't seen it yet.

MEMBER BEACH: But then again, in the '70s there were.

DR. TAULBEE: In the '70s we know there was. And in fact, it didn't even have to say "all-area." They could wear their MTR badge into CPP.

MEMBER BEACH: It might be a question of why they would go -- in the '60s, why they wouldn't use all areas, if they were using them on either side of that.

MR. STIVER: I'd like to know what the basis for that decision was.

MR. BARTON: Well, that was a curious point, though. I mean, why even have an all-area badge if you could just have an INL badge and go into any area you wanted?

DR. TAULBEE: I'm sorry?

MR. BARTON: For that '70 to '74 period, you could just take your badge anywhere. So why would they even issue all-area badges? It was kind of curious.

But the reason I really brought this up is because there's sort of an ongoing issue about emergency response personnel and whether they might be the exception. You know, if there's an emergency, they're not going to stop at the gate and fill out a temporary badge that they may have had, like an emergency badge.

And I think that was something that was brought up both at the January and March meeting. And I think you guys are still sort of working through that to come up with a response on that.

DR. TAULBEE: Yes.

MR. BARTON: This is the firefighters' potential for that. So, that's why I brought that up as an observation.

If anyone has any questions, just stop me. Otherwise, I'm going to keep motoring on.

MEMBER BEACH: Go for it.

MR. BARTON: Okay, Observation 5. This is Case 26, Section 2.26, page 31 of 41.

So, SC&A observed -- and actually Observation 5 and 6 are for the same case.

SC&A observed visitor badges for which the area designation was illegible or cut off on the DOE response records. It is SC&A's understanding that the individual visitor cards are grouped by site area. Therefore, DOE will

be able to identify the work area, even if that particular section of that particular visitor card is illegible or unable to be read.

And you sometimes see handwriting on some of these records where it is a little bit illegible. Or, you know, some of the bioassays will say MTR, ETR, CPP, and you're like, okay, well, which place was he? But they will circle one in pencil.

So, that was Observation 5, and basically saying, well, you might have legibility issues with the actual area, but that doesn't necessarily mean we don't know where that area is going to be, for the purposes of assigning it in a dose reconstruction context or an SEC context.

So, again with the same case, was Observation 6. And as Tim alluded to this earlier, we observed that many visitor cards contained an S-number, a security number, which is a unique identifier for an individual worker. This allows for a second piece of

information beyond the name of the worker, to allow for identification of the worker with a given work area.

So, even if you might have some spelling issues, you might have some legibility issues. That doesn't mean you are not going to have legibility issues with the S-number as well, but it just adds to that extra layer of information to sort of allow us to get around these records. They were really handwritten visitor cards. There was considerable uncertainty and discussion, both in March and January, about the issues of legibility and different name spellings. And in the case of the name spellings, you are not going to, hopefully, misspell that security number.

So those were both -- these are the two visitor cards I alluded to. You can see here, this top one in Figure 2. I don't know what area that is. It looks like somebody punched a hole through it. But as you can see down here, there's an S-number. I crossed it

out just to be safe for Privacy Act reasons, but I don't know why, no report like this ever gets fully distributed anyway.

And this one down here, again, the area is cut off. And this one did not actually have an S-number, I don't believe, but it had a name up here, which I also blacked out.

DR. TAULBEE: If I could point out here --

MR. BARTON: Sure.

DR. TAULBEE: With these areas, you know, where it's kind of cut off there: that's a scanning issue. The card is still available. So, this I can go back and get that. And hopefully, whenever they are indexing these, they will.

MEMBER BEACH: Make sure that those were visible, yeah.

MR. BARTON: I mean, I would think if you have a box of CPP records you'd say just get them coded as a CPP record.

Okay, moving along to Observation 7.

This is for Case 29, Section 2.29 at page 34 of 41. Some correspondence with the EE's survivor indicated three different name variations, two of which were observed in the available visitor cards. And nearly all of the visitor cards included an S-number to allow for positive identification. At least one example only contained the name, but, again, this is another instance of you have that S-number there to try to get past some different name variations.

And you see this first bullet here, those were the three that were mentioned in the DOL case file by the survivor of the Energy Employee. And you can see some of them are similar. That last one is a little bit different, and there's even a Junior thrown in there. But the survivor indicated they would spell their name differently, depending on whether it was a birth certificate or a driver's license or marriage certificate, or what have you.

And this is the one example we found

where we just only had the name, but the name was the more common spelling you would find in them. So it's very likely that DOE would be able to say, alright, we understand that that is this person up here, who I will not say their name.

And finally, Observation 8, which was for Case 32, this was the very last case. This is in Section 2.32, page 38 of 41. At the time we reviewed this claim there was really only a DOL initial case, but that often contains a lot of useful information. This is one is particularly interesting, maybe only to me. We didn't have CATIs or DOE yet, but what we found buried in this thing is a report of occupational medical or first aid case.

And as you can see, it is very illegible. I circled the area here and then blew it up 800 times. And as you read this, what I see is CPP and "on loan" in parentheses. I might have a vivid imagination there. So we noted that one and said it looks like there's

evidence.

And I'll also note, at the bottom of this form, there's a much more legible date of 1966. So, again, we're like, alright, well, that seems like clear evidence this person was there. And in NIOSH's report, they actually went and found records in '67, '68, and '73, all associated with CPP.

So we just recommend, really, closing that observation. We brought it up because we knew we were doing CPP and didn't have the records yet. And I guess additional information came along and records were found. So we can close that one.

And that's the end of sort of the conclusions of our review of the 32 claims. I would be happy to field any questions.

CHAIRMAN SCHOFIELD: Anybody on the phone got any questions?

(No response.)

MEMBER BEACH: Hearing none? Okay, so this kind of brings them together. Is there

more work? Because you mentioned a couple of different times that there was some other observations that you would actually add to this report.

MR. BARTON: No, there were more, I guess you could call them observations in progress, until we know that DOE has all of these temporary badge reports coded and they can add them into the claimant files. That was really one of our concerns. It's like, well, if we were going to go based strictly on what's in the DOE response for the claimants, there's some uncertainty in some of the claims.

What we've been hearing is that it's really a problem that they weren't indexed completely. And so as this indexing process wraps up, what I would assume would happen is that DOE would be sending additional files, additional responses. And you'll see this in a lot of claim files, where they'll send an initial response and sometimes it only has an X-ray record in it, and then they'll send sort

of addendums as the information becomes available.

So, I would say that those are claims where there is still some question -- I can't say for sure that they're going to find them once they index those records, because we just don't know. But I will add that only that one single claim or case that Tim talked about, and that we agreed with, is the only one that really seems really outstanding at this time, pending getting all those temporary badge reports.

And the other claims either would be compensated or didn't meet the 250-day criteria anyway. That's kind of, for me, that's one part of it: they're either in the SEC or you're not, but the other part of it was just sort of testing the Class Definition with this, too. It's not just, well, we think they were in CPP but we don't have a record. They may already be included because they were monitored from '70 to '74 at TAN. So they might already be

included in the Class, but there's still some question about the evidence that they were at CPP, and we don't quite have the information yet in the DOE files that say that they have a badge.

MEMBER BEACH: Right.

DR. TAULBEE: And if I could add to that, keep in mind that if they worked from March of 1970 through December of 1974, they very well could have been monitored somewhere else and worked in CPP.

MEMBER BEACH: Sure.

DR. TAULBEE: So, from the CATIs and from the other information, we can never rule out that they were not at CPP in that time period. That's why we've expanded that Class.

MEMBER BEACH: Right.

MEMBER ROESSLER: So, do we have to wait until the temporary badges are coded to make a decision on this?

MEMBER BEACH: Well, we had, originally, our last meeting we had asked for

maybe some sampling and some verification, and a proposal of how to verify. So, I guess we are still not to that point where we can even do that yet. Is that correct?

MR. BARTON: Well, as far as V&V goes, I thought that the comparison of the totals that we have in hand that haven't been necessarily coded yet so we can associate them with a particular claim, but we know how many in a particular time period, and then pairing that against how many HP actually issued, that, to me, is sort of the V&V activity.

I'm not sure what we can do beyond that, except maybe, once those visitor cards are obtained, compare them against the temporary badge listings to see if those both jive together, but I don't see why they wouldn't.

I mean, the process really is, so, if you're going to get a visitor card, you get your card, you go in, you do your work. The card comes out, and then those cards go on the

temporary badge reports, and then those temporary badge reports went into the HP reports.

So, the visitor cards are really the first step in the process. And that's one thing we haven't looked at, is comparing the visitor cards or doing a sampling of the visitor cards and make sure we see all those people in the temporary badge reports that have been captured.

I'm not sure if that brings us significant new information that would be beyond what we have today as far as the V&V approach goes, but it's certainly something I'm perfectly willing to do, if that's what the Work Group wants.

DR. TAULBEE: My thoughts on this is that we've gone through and we looked at how many temporary badges we have. We compared those to the monthly reports and we believe them to be complete.

We've gone through and looked at 913

claims that we've currently have found, and there's one that we had difficulty with. So, for the vast majority, this Class Definition really works. We have a lot of other open issues to still deal with for the site.

MEMBER BEACH: Right.

DR. TAULBEE: I guess I would ask that the Work Group consider approving this Class so that we can move on to be working on the other aspects of the site.

The more that we get into more and more details on this, it does take away some resources that we have for other things. So I'd ask that you all consider that.

MEMBER ROESSLER: And that is what I was thinking, too, based on the very small percentage that's not resolved, and, based on Tim's report, that we ought to move this forward.

MEMBER BEACH: I guess I'm curious to hear from Dr. Melius. And Dave Richardson is not on the phone. Is that correct?

MR. KATZ: Well, he hasn't been. David, have you joined us?

(No response.)

MR. KATZ: Yeah, I don't think he is joining us.

MEMBER MELIUS: This is Jim. Can you hear me?

MR. KATZ: Yes.

MEMBER MELIUS: Okay. My understanding is that this Class can't be implemented until all the keypunching and the database is completed.

MR. KATZ: That's correct.

DR. TAULBEE: That's true.

MEMBER MELIUS: Right. And I don't know, Tim or anybody, if there are specific plans already in place to validate the database once it's in place, but it would seem to me that any remaining questions could be addressed through the database. And that I think what we want to do is have something in place so that can be done relatively quickly and effectively

and efficiently in order to be able to move forward.

And secondly, I think there are still some issues that keep coming up that have been sort of put off, and one is questions just about the practices of the plant. What about the emergency response group? How were they badged? What was the practices for dealing with them?

I get a little concerned when we end up with potential inequities in terms of the Class. Well, if a person's in there, one misspelling and we missed a badge, that means that they wouldn't have been in there for 250 days in a year, but at the same time, we're allowing other people in knowing that they are not in for -- without any evaluation whether they've been there for 250 days.

So, I think there's more work that needs to be done, certainly before I'm comfortable with implementing the Class Definition. But I'm not sure a lot of it --

you know some of it could be done ahead of time, but I think some needs to await until the database is complete or near complete.

I don't quite understand the process, and I don't think Tim has -- I remember what you said earlier Tim is that you don't have a date when that will take place.

DR. TAULBEE: I don't, because we are going to need to talk to Department of Energy. It is their database.

MEMBER MELIUS: No, no, I'm not doubting you with that. It just seems to me that we have time and we ought to be getting prepared.

MEMBER ROESSLER: Jim, I'm not clear what work or what things you're putting on the table to be done beyond what's already been done. It's just not clear in my mind what work needs to be done to validate the database.

MEMBER BEACH: One that's clear is the emergency response group. We saw, some of them were all badged. It's not clear how the

firefighters were badged. That's one area.

DR. TAULBEE: And that's one area where, in doing some follow-up, I think we're going to have to conduct some interviews. One of the individuals that I think I definitely want to talk to, if you recall, is the individual who responded that night to SL-1, who is a [identifying information redacted], and ask him how he was badged. So, to do follow-up with him to try and identify some other firefighters and ask them. Because I don't think we're going to find this in the records explicitly written for these particular workers. So we're going to need to identify some of the firefighters and actually conduct some interviews.

MEMBER BEACH: Well, and I'm wondering, if you had some of the firefighters' or the emergency response personnel's names, could you just go in and look for their particular badging and see how they look?

DR. TAULBEE: Yes. Yes, we can.

And that's one of the things I wrote down here, that we can do some follow-up on the firefighters.

But from the database standpoint, I think back to what Gen might be asking here, is DOL -- or DOE, this is their index. This is their database. Once they get this, again, the cards themselves, the 1968-forward cards will be done by October 1st, and then they are going to start, if they get funding, on those temporary badges.

So, how long that is going to take, I don't know.

MEMBER BEACH: And they are going to start on those, those are from '63 on or --

DR. TAULBEE: 1963 up through 1968 -- actually, up through '70.

MEMBER BEACH: I guess we'll definitely bring that up to Greg Lewis at the meeting.

DR. TAULBEE: And I don't know how long that is going to take. I do know that

there are claims currently that can move forward in this time period that we've identified from the regular dosimetry, both construction trade, CX, as well as CPP. So, I mean, the Class is kind of being held for a validation of temporary badges, at this time.

To me, I could see a phased implementation by DOL of basically people who are already part of the Class, moving those people forward, and those that are indeterminate because we don't know from the temporary badge standpoint, they don't deny it yet, but we wait until they get that done.

MEMBER BEACH: Yeah, and I suspect if the Work Group were to vote on them, it would be a split decision. And it might be something that needs to be brought up to the Board, and the Board needs to decide if they are comfortable waiting or if they want to push forward with those cases that are available.

So, I mean, it's a tough call. I don't know that this Work Group -- like I said,

it would be split and we'd probably -- I don't know what you think, Jim, if it's something we should just make a decision to wait, make a decision to go ahead, or bring it to the Board and let the Board decide on this portion of it.

MEMBER MELIUS: Well, I just would add that, in my recollection, we have never put forward an SEC where we're deliberately leaving out a whole class of --

MEMBER BEACH: Individuals.

MEMBER MELIUS: -- yeah, a significant part of the Class.

MEMBER BEACH: Right.

MEMBER MELIUS: And I'm very wary of doing it when we don't even have an estimate of when the database will be available.

MEMBER BEACH: Correct.

MEMBER MELIUS: So, we're telling some people they get compensation now and some people can wait a year or two or years? I don't know what the --

MEMBER BEACH: Yeah, that is a good

point.

MEMBER MELIUS: Given that it's dependent on DOE funding cycles and end of year issues and so forth, that makes me even more leery.

CHAIRMAN SCHOFIELD: Aside from security and the fire department, do we know if there was any other, like maybe a special response group from the crafts or --

DR. TAULBEE: All indications are is that everybody walking into CPP had to be badged, whether they had a permanent badge there, whether they were construction for CX, going in through CX dosimetry, or on a temporary badge. That's the indication that we have right now.

We do have indications of all-area badging in the 1950s, and we don't know about the firefighters and so forth. My guess, at this point, is that we're going to find badges for the firefighters on temporary badges, through where they went and did fire

inspections. So they're already part of the Class. The people that wouldn't be would be if there was a fire, and that's something that we will ask how did they respond during a call-out type of scenario to the site. Was there a badging that was there for them coming through the gate? And I don't know the answer to that. I just don't know.

CHAIRMAN SCHOFIELD: See, that kind of concerns me, both for the fire department standpoint and from the security standpoint, is not knowing if they had, like, classified vaults or alarmed doors or something where the response, you're not going to stop to exchange a badge.

DR. TAULBEE: Now, keep in mind, this plant operated 24/7. So the site had security there onsite. So the vaults and so forth, they had people. We know there were security guards there. I've seen their badges. We know they were there. The same with firefighters. They're on within CPP.

It's did central or did some other fire department come and respond? I don't know. So, from your alarms that you're seeing locally, there was onsite folks to do that.

CHAIRMAN SCHOFIELD: Right, but my concern there is most facilities, your security people, you may have some of them working in a certain area most times. But if they're short-handed or something, they would bring people who were also qualified to come to that area, maybe in a response to a situation.

DR. TAULBEE: When they were loaned out from another facility, they got a temporary badge for the facility. That's what we have learned through the interviews, is that they got a new badge coming in for that facility, up through 1970, every time.

MR. KATZ: Jim, were you trying to say something?

MEMBER MELIUS: Well, I was just saying we can sort of speculate one way or the other. I'm not saying Tim's wrong, but the

simple thing is let's interview them.

DR. TAULBEE: I mean, in the 70 interviews we've conducted so far, that's what everybody has told us. Now, we have not specifically interviewed firefighters, that I recall. We have interviewed some security folks and we did not ask them -- well, we asked them about going into the area, that they did pick up a badge.

The one that I want to do the follow-up on was the guy who responded at SL-1 and he --

MEMBER BEACH: He spoke at our meeting last year?

DR. TAULBEE: I don't think so. A different guy. Different guy, yeah.

And so he's one that we know we can follow-up with and find out, if this were to have happened, what would you have done, and what were your procedures from that standpoint?

But the other 70 people that we have talked to, they went into that area in that

time period, they picked up that facility's badge. And that's been reflected through all of the interviews that we've conducted.

MR. KATZ: I think on the question of -- Jim, the question of timing with respect to DOE and funding the second phase, I think we can, in advance of the Board meeting so Greg is not blindsided, shoot him an email and say this is an issue that the Work Group, the Board, will be concerned about. When would all that work be completed? And ask them to work on that before the Board meeting.

MEMBER BEACH: Good idea.

DR. TAULBEE: That is a very good idea. Ask them to include it in their update.

MEMBER ROESSLER: And who would do that, send the email?

MR. KATZ: I think the program can do that, since they talk with them regularly anyway.

(Simultaneous speaking.)

DR. NETON: Yes, it will come

through our -- we have a chain we'll talk to Greg through.

MR. KATZ: Okay.

MEMBER BEACH: Alright, so I put down some action items. Please add to them. Funding, Greg Lewis, I just added NIOSH as sending a pre-email. And then NIOSH, I put down interviewing emergency response personnel, firefighters, that.

SC&A, any actions that you think that you can accomplish in the interim or it is pretty much waiting for those all to be loaded?

MR. BARTON: Yes, it is kind of too fast. The coding is really to see if sort of these claimants that -- a lot of them we identified and said well, we have evidence that they were at CPP but we don't have a badge. But then NIOSH captured the badges and we manually searched. So, the test would be once those things are coded, I'm not sure how we would access DOE's database or if we would just request like our -- you know, run this guy --

MEMBER BEACH: They would have to give you them.

MR. BARTON: -- run this person again and then we could see if those temporary badge reports that we found manually are all included in the file that would kind of, in a way, be a sample validation to say that they did the coding correctly. The badges we found are now getting transmitted kind of thing.

MR. KATZ: I mean let's talk about that because I am sort of -- what Bob was saying earlier is we are not getting a lot of value added by doing -- that is really not more validation that is that useful.

MEMBER BEACH: Yes. But we wouldn't do that now, though.

MR. KATZ: No, I'm not sure that -- I just want clarity as to whether it is worth doing and spending money on at all is what I am raising as question because we don't need to just throw money at a problem that is already as good as it is going to get, in a sense. So,

I need clear direction from the Work Group before we task that or don't task it, whatever. But it sounds to me like it is not useful.

MEMBER MELIUS: What I was suggesting is that we have SC&A develop a protocol on how they will do an evaluation with some options. Then, we have a Work Group call to go over that.

MEMBER BEACH: Which we discussed at the last Work Group meeting, correct?

CHAIRMAN SCHOFIELD: I think a lot of this also kind of depends on waiting on what DOE can do before we really know where we can go.

MR. KATZ: DOE is just -- they are just entering data.

CHAIRMAN SCHOFIELD: Right, they are entering data but then I mean once that data is entered, then we can --

MR. STIVER: -- just trying to see how we can really do anything of any use until that data is all entered.

CHAIRMAN SCHOFIELD: That's my point. I don't see how we can do much until we can have access to that data.

MR. KATZ: Well, I guess what is useful for you is not -- you don't have to wait on the data to tell us what is the value added of whatever you might do with that data. You don't have to see the data for that.

MEMBER BEACH: Yes, so you can develop a plan, whether it be a one-page or what, to tell us how you would validate it and that would be just a simple call.

MR. STIVER: Okay, we can do that.

CHAIRMAN SCHOFIELD: I think both NIOSH and SC&A are kind of dead in the water until this data is available.

MEMBER BEACH: Other than developing that plan.

DR. TAULBEE: We will try and set up some type of interview.

MEMBER BEACH: Some interviews. That is something we can go ahead with.

DR. TAULBEE: We are going to be running into timing and travel issues here. So, we will probably -- we might try and do some of these via phone. But if we can't, because we have had some interviews refused, if you recall, due to they wanted them more to be face to face, they can't handle -- they can't do the phone.

But we are nearing end of year. In fact, we are past time for setting up trips and interviews, at this point.

MR. KATZ: Yes, well, you can certainly let the Work Group know what the disposition of that is.

DR. TAULBEE: So, we will be working on this over the next few weeks and we will see where we are.

MEMBER BEACH: I suspect we are going to hear from Joe, too, that he was talking about some interviews for some of the other areas of inquiry, the burial grounds and things like that, too. So, it might be

something we could combine and --

DR. TAULBEE: And do a full week out there like we have done in the past.

MEMBER BEACH: Yes, do something so it is more useful and beneficial.

So, anything more on this topic?

DR. TAULBEE: Can I ask, does early November tend to work for folks, if we were to do that?

MEMBER BEACH: I think so.

MR. STIVER: That would probably be the soonest you could, given the funding and end-of-year restrictions.

DR. TAULBEE: The first two weeks of October is pretty much out and I happen to be out the third week of October.

MEMBER BEACH: So, can I call for a break at this time? Is everybody amenable to that?

MR. KATZ: Yes, good idea.

MEMBER BEACH: Alright, let's do that.

MR. KATZ: So, we will go for just a ten-minute break. Folks on the phone, I am just putting the phone on mute, but still here.

(Whereupon, the above-entitled matter went off the record at 10:29 a.m. and resumed at 10:45 a.m.)

MR. KATZ: So, we are back here in the room. Dr. Melius, are you back with us on the line? Jim Melius, are you with us?

(No response.)

MR. KATZ: Who is up next on the agenda?

CHAIRMAN SCHOFIELD: I think it is the White Paper discussion.

MEMBER BEACH: Actually, Joe was going to --

MR. STIVER: Yes, we leapfrogged over to Joe.

CHAIRMAN SCHOFIELD: Oh, okay.

MR. KATZ: Joe Fitzgerald?

MR. FITZGERALD: Yes, hi.

MR. KATZ: Okay, so you are there,

Joe. I am just waiting for --

MR. FITZGERALD: I'm going to be just running through and it will be brief.

MR. KATZ: Yes, one second, Joe. We are still waiting on Dr. Melius to rejoin us.

MR. FITZGERALD: Alright.

(Whereupon, the above-entitled matter went off the record at 10:46 a.m. and resumed at 10:50 a.m.)

MR. KATZ: Dr. Melius, are you with us?

MEMBER MELIUS: I'm back now, yes.

MR. KATZ: Okay, great. Joe.

SC&A Updates – Data Capture Efforts, Burial Ground CPP Pre-1963

MR. FITZGERALD: Yes, good morning. I think we have done this update before but I think it helps, you know there is so much focus on the Class Definition, it is useful just to remind people that there is a lot of intensive work going on in a more traditional evaluation process for those facilities and time frames

for which I think the ER indicates that dose reconstructability is feasible.

So, back in the fall, we focused on what those time frames in facilities that for which the documentation, the records, perhaps some of the monitoring information was not complete but for which NIOSH was indicating they felt they had enough -- maybe it is weighted evidence or other aspects that they could in fact do dose reconstruction.

So, over -- I would say about six months -- we have been in the process of going out to the site doing onsite data captures. This is in addition to what was a rather intensive effort that NIOSH undertook last year. So, this complements that, more focused on what the Work Group and SC&A thought were issues of importance.

And we focused on the burial grounds and the pre-'63 CPP and even a couple of aspects of the reactors primarily because the records weren't complete and we had some

indication of issues that we felt were important to run down. And because the records proved to be incomplete, we did I think a rather intensive sweep of interviews for which I think Josie and Gen were pretty much involved in all of them. So, this has been a pretty complete effort.

Where we stand now, at this point, is we have I think captured just about all the documentation that is available for the burial grounds. And I might add that isn't -- that we didn't complement what was already there by much. We did get certainly additional information on contamination surveys, even some air sampling data. But I think it is safe to say there wasn't a whole lot of record keeping associated with the burial grounds.

At that time, in the early years -- we are talking before '70 -- it was operated pretty much as a landfill. It got a little better as time went on. But essentially, had pits and trenches for which radioactive

packages, drums, and cardboard boxes were disposed of and essentially overburden was put on top and that was the process.

So, not very sophisticated or technologically sophisticated but we were concerned about walking down the basics, the source term, the exposure potential. Is there enough basis for concluding that one could ascribe either no exposure or minimal exposure, which is where the ER is pointing toward, at least for the burial grounds.

I will let Bob Barton talk about CPP pre-'63, but essentially, we have been trying to walk that down to the burial grounds with the primary concern that because of the nature of the operation, you essentially dropped drums in, you dropped cardboard boxes in, everything onsite, including Rocky Flats waste went into the pits and trenches.

Certainly, the source term was there. Certainly, there were still contamination. So, the question we were trying

to track down is to what extent the workers involved were exposed and how would you be able to characterize what they were exposed to and to what degree? So that has been most of that process, and we have talked to quite a few people and have even gone so far as the National Archives to walk down some of the documentation.

I might add we have a couple more interviews. This isn't with burial ground workers but the interview process continues. We are talking to two more workers in conjunction with the Board meeting next week.

The bottom line -- I will let Bob jump in on CPP for a minute -- but the bottom line is that we are still waiting because of the indexing delay that you heard about from Tim, waiting for some of the final documentations from the latter data captures to be uploaded so we can actually reference that.

As soon as we have that documentation, we are going to be in a position

to, I think, put a bottom line to our assessment on the burial grounds and pre-63 CPP so that we can inform the Board sort of what the final analysis of what we could find and what we did hear from the interviews. What does that seem to mean in terms of our assessment of the ER in those areas?

But I think, again, it has been a pretty intense effort from January through -- actually through April, and not too many rocks left unturned as far as records.

Bob, do you want to add something on CPP?

MEMBER BEACH: Well before that happens --

MR. FITZGERALD: Yes.

MEMBER BEACH: I think Tim had a question, I think and then I have one.

MR. FITZGERALD: Yes.

DR. TAULBEE: Okay, not so much a question, more of a clarification, Joe.

MR. FITZGERALD: Yes.

DR. TAULBEE: The indexing the DOE is doing has to do with the dosimetry cards. The delay in getting our records that we have requested from these previous data captures is actually just reclassification. It is not reliant upon the indexing that is going on. It is a delay with the Classification Office looming and kind of being short-staffed. That is the reason for that delay. The two are not related at all.

MR. FITZGERALD: Yes, thank you. That's right. There is another conduit that is holding that piece of it up.

DR. TAULBEE: Right. And to give a little bit of an update on that, I have been talking to the site. They are anticipating releasing some of those documents to us this week or next and the remainder of them by the end of the month. So, their goal is to actually get us all of the documentation that we have requested from capture to us by the end of August. Whether they meet that or not, I

don't know but I will keep you posted along that lines.

MR. FITZGERALD: Yes, and I might add based on what is in the documentation, I should say that we may have some additional interviews related to the burial grounds and pre-63 CPP that we might want to shoehorn into November just to have a complete set of what we can get.

At this stage, we have a lot but when we look at this final set of documentation, there may be other names that are associated with those documents. And if they are available, we would certainly want to talk to them.

DR. TAULBEE: Okay.

MR. FITZGERALD: Josie, did you have a question?

MEMBER BEACH: You answered my question. I was going to ask you if there was any other interviews.

MR. FITZGERALD: Yes, I think we

have got to look at that. We were out in March and that is the documentation that is being held up in classification. I think, as I recall, there were some very interesting pieces in there that may lead to a few additional interviews.

DR. TAULBEE: And Joe, one other thing I will add with this, the site is tracking down for us, at least from ER addendum standpoint, that one drum retrieval in 1969.

There are some records that we found out at Rocky Flats and they are classified holdings that were sent to INL. I have looked at those and we are getting those transferred to Germantown so that you can look at those as well. But this is really related to the ER addendum.

MR. FITZGERALD: That's excellent. Just the big picture on the burial grounds, before I leave it. I think most of our concerns is a lot of the late -- I would say mid- to late-'80s concerns over what they

considered mishandling of alpha source of material at the burial grounds, we did a complete overhaul of how that was done.

So, we wanted to look backwards in time to assure ourselves that those exposure pathways and that management wasn't so inadequate in the early years that you would have these exposures happening without appropriate monitoring. I think the key thing is that there is very little bioassay in those early years. There is some but not very many at all.

And in talking to the workers involved, it was pretty clear that they had some contamination that they had to wash off every day. Certainly, there was some exposure. The question is whether it was beyond negligible and certainly whether it involved radionuclide concerns. So, there are still some questions clearly, in that area.

Bob, did you want to add something on CPP? I thought the March onsite survey had

a number of documents that were a bit interesting in that regard.

MR. BARTON: Sure, Joe, thanks. Yes, I remember the SEC and CPP in the '63 to '74 time period was really based on the fact that you had alpha-emitting material, actinides and whatnot that was separate from fission product material. The current approach is to reconstruct those alpha exposures you would sort of use the fission products as an indicator. But if you have material that is there that is only the alpha-emitting, then you really can't use a fission product because it is simply not there. So, that was really the focus of the data capture efforts, at least from my perspective, as related to CPP, is was it possible that you had material there prior to 1963, in this earlier period where you would you have possibly situations where there is alpha that is separated from the fission products that could have been a source of inhalation or ingestion, an internal source.

And we went through a lot of boxes focusing on boxes that hadn't been necessarily looked at in earlier data captures. And I think what we pulled are really several examples. I mean there were piles three feet high of health physics logbooks of daily activities. They would log, you know, I went to this area and there was a Cutie Pie, which is a radiation monitor. I took measurements here. I took swipes here. And so there was some interesting information there. And again, we are still kind of waiting for that to be uploaded to the SRBD.

There were also the actual survey -- there were some survey maps that would actually show you alpha and beta, if it was measured. So, it is really the question of do we have evidence that there was a source term there that can't be reconstructed using a tracer such as the fission products.

And again, it is tough to say where we are going to come out on that. It looks

like there may be some interesting things going on in the shift laboratory, where there might have been small quantities. Obviously, that wouldn't be a widespread source term. But again, we need to take a look at those survey reports and the bioassay logbooks. Now, we didn't capture all of them because there were just so many that --

MEMBER BEACH: We did a bunch of pages on --

MR. BARTON: Yes, we essentially did individual example pages out of those. So, once we get those, we can start to put the pieces together and get a better picture of --

MEMBER BEACH: Something I recalled, we came across a lot of different names associated with a lot of those pages that we hadn't talked to in the past for future interviews.

MR. BARTON: Those could be resources -- yes, they agree.

MR. FITZGERALD: I was going to add

the other thing that was helpful, and I think Tim and folks were with us on that, we would test the hypothesis of visitors and transient workers/subs. We did talk to a number of them and any who had indicated work at CPP, we tested this notion of how they were badged. So, that was, again, sort of a side validation that we did along the way that was useful.

MR. BARTON: And along those lines I remember specifically I came across one sort of procedural report. I believe it was in the early '60s, possibly before the SEC period of 1963, where it spells out that you will get, as a subcontractor, the same exact HP coverage as the prime contractor workers but you also have to play by our rules.

So, if we tell you to do something, you can't just go up and do it by yourself. That was a very interesting thing that we captured. It is not necessarily related directly to the early period of CPP but certain an interesting report that we came across.

We also came across a bit of alpha air sampling data, I remember, for CPP in the earlier period that we are going to want to take a look at.

MR. FITZGERALD: And sort of similarly, given the SEC question that arose at Hanford, we also, I think, quizzed the workers we talked to about the relative treatment and management of subcontractors versus operating workers, in terms of the equality of how health physics coverage in management and monitoring.

And I think, unlike Hanford, what we heard pretty universally was that everybody was afforded the same level of monitoring if they were doing certain jobs but it was helpful to kind of make sure that inquiry was done. Any questions on that?

As I indicated, we are going to keep going on this and as soon as the documents are available in the SRDB, we intend to put up a White Paper. It may be sort of time to take advantage of maybe a final set of interviews in

November.

MEMBER MELIUS: Yes, this is Jim. One question that came up -- it was an observation I think that Tim mentioned earlier I am just curious about is -- trying to understand is as I understand from what Tim was saying earlier, we know there was this transition where for a period of time badges were by area. And that is the whole basis for our struggles with the CPP area. Then, it transitioned to a single badge covering multiple areas or the entire site.

But Tim, I think you mentioned earlier that -- or Bob did -- that there was an earlier time period where there also appeared to be sort of a single badge for the entire site or for at least the workers got the -- a significant number of workers got sort of all-site badging rather than -- you know through a central facility of some sort, rather than by area.

It just seems to me that as you are

doing the interviews and sort of documenting what went on there, it would be helpful to know, you know try to pin down the history and the timing of some of that. And I didn't know if it was something you had run across, Joe, in your interviews.

MR. FITZGERALD: Yes, I mean I think we have asked badging questions to almost everybody that we have interviewed, even specific to the burial grounds or CPP, just trying to paint that picture.

I think we did talk to a few individuals that went that far back. I just don't recall off the top what their response was. I guess Bob or Tim?

DR. TAULBEE: This is Tim. That is correct. We haven't run into anybody that has indicated they had an all-area badge in that early time period prior to 1970 but we have found some of those all-area badge reports in the 1950s.

I will clarify a little bit on

those. When we found them and the time period I am talking is like 1953, '54, '55, '56, '57 time period where I have seen those. The number of people on that all-area badge report typically is around 20 to 30. It is not a very large number. So, it doesn't seem like it was something that was done a great deal, which is why I think in our interviews it has been confirmed you got a new badge when you went to each area.

But at least in the late 1950s, there was a group of people who appear to have had an all-area badge. And if we can identify any of those to interview, I think that is a great idea and then we will certainly try and do that. In fact, I think I will try and pull the '57-'58 time period -- actually, I am not sure there is one in '58 -- and see if we have got anybody that we can identify from that to talk to.

MEMBER MELIUS: Okay, great. Thanks.

CHAIRMAN SCHOFIELD: Tim, I have got one quick question for you on those interviews about the film badges in the early days.

Was there badges for certain people that are biased towards like the potential neutron exposure or was one badge used for all areas and they didn't differentiate between those who might have neutron exposure versus those who don't?

DR. TAULBEE: How do I answer this? There are certain people who are identified as being potentially exposed to neutrons and they had a neutron insert within their badge. And so when their badge was exchanged, both the beta-gamma and the NTA film were exchanged at the same time. But there are other people in the same area who were not designated as being neutron exposed. So, you have got both in the same area. So, it is not just all CPP or all MTR. It depended upon what their job was within that area and what they were doing.

From my understanding, what I can tell is that the local area health physics decided who would be neutron monitored and who would not be neutron monitored in that time period.

When you get into the late 1960s, it actually changes a little bit in that at MTR they started relying more on neutron surveys type of -- they reduced their NTA film usage, in a sense, so that we do see a decrease from that standpoint in that time period. So, it is a mixed bag with neutrons across the different areas.

CHAIRMAN SCHOFIELD: Okay, thanks.

DR. TAULBEE: Back to the other issue, we will try and find some of those interviews. We will try and see if we can't do that. It seems like we are getting quite a grouping of potential interviews for November, at this point.

And Bob, did you want to add anything?

MR. BARTON: No, I think that is a pretty good characterization of it.

MR. FITZGERALD: Okay, I guess that is about it. Again, I think the Work Group has been pretty involved the whole way as certainly Tim and his folks have. So, it has been a pretty good effort.

MEMBER BEACH: Sounds good.

CHAIRMAN SCHOFIELD: Okay, anyone have any questions?

MEMBER BEACH: Okay, next on the agenda.

CHAIRMAN SCHOFIELD: Okay, we are in the reactor. Steve Ostrow, I guess, is up.

DR. OSTROW: Hi, this is Steve. I think, didn't we decide that Hans is going to go first because he had some travel commitments?

DR. H. BEHLING: This is Hans and I did want to break in. Thank you for doing this, Steve. I do have a doctor's appointment that has been on the records for a couple

months and I can't afford to allow this to go and ignore this. So, I have to leave by somewhere close to one o'clock. And if we go through our lunch period, I can hardly assume I can still fit in.

But if we do take a lunch break at 12:00, with at least two other papers, I don't know how long they are going to take. I may not be able to stay.

MR. KATZ: Well, Hans, why don't you go now?

DR. H. BEHLING: I didn't hear what --

MR. KATZ: Oh, Hans, go ahead and go now and that way you won't have to worry about that.

DR. H. BEHLING: Okay. I am going to have to go to my other phone because I want to be able to speak without having to hold the phone.

MR. KATZ: Sure.

DR. H. BEHLING: So, if you give me

a second or two, I will go to this other phone. Hold on.

MR. KATZ: Thanks.

MEMBER BEACH: So, what we are doing is moving up number five on the agenda, the review of Petition Evaluation Report of SEC-00224, Argonne National Laboratory, regarding the use of general air sampling and internal dose assessment. So, that is where we are going if you want to find those files while Hans is changing phones.

DR. H. BEHLING: Okay, can everybody hear me?

MEMBER BEACH: Yes.

MR. KATZ: Yes, Hans.

Review of Petition Evaluation Report for SEC-00224, Argonne National Laboratory-West Regarding the Use of General Air Sampling for Internal Dose Assessment

DR. H. BEHLING: Okay. I guess I am obviously jumping ahead of the other speakers and so I just want to quickly backtrack because I realize there was going to be some

discussions regarding the issue of the ten percent MPC versus the use of the mixed process way of assessing internal exposures to uranium, thorium and plutonium.

But anyway, in my discussion I want to obviously be sure everyone understands that the discussion regarding use of air sampling is limited to issues that involved exposures to the three actinides uranium, thorium, and plutonium in the absence of fission products. We can quickly go through the second slide that talks about what the potential relationship is to the air sampling. So probably most of the assays that were, going back, pertains to the use of mixed fission products, those would probably be the majority of cases. There is only going to be a limited number of instances when the exposure to uranium, thorium, and plutonium occurs in the absence of fission products.

MEMBER BEACH: Hans, can I interrupt?

DR. H. BEHLING: Yes, sure.

MEMBER BEACH: Are you the one on the screen? Can you maximize that? Mine's pretty small.

MR. STIVER: Actually, I am doing that right now.

MEMBER BEACH: Could you just make it bigger?

MR. STIVER: Okay.

(Simultaneous speaking.)

MR. STIVER: Okay, yes. Is that better?

DR. H. BEHLING: Okay, we're on slide 3 here. We have skipped the other slide that I feel is really not necessary.

But the issue here that we want to talk about today are incidents when workers at the ANL-W were potentially exposed to uranium, thorium, and plutonium, in the absence of fission products. And the way it was intended or NIOSH proposes to assess these people was to use general air monitoring and assessing the

air monitoring data for gross alpha activities. And the way they would tend to do that was to use stationary or fixed air sampling data with relatively low flow rate and then, essentially, using, which we will show in the next slide, that data to assess the potential exposure for the actinides.

And for alpha activities that was mentioned in the general air samples, there was usually the presence of other alpha emitters. Obviously, we know the presence of short-lived alpha-emitting radon daughters but in the case of the thoron, you also have other alpha-emitters that have to be removed because they really do not contribute to the actual exposures of concern. And as you will see in a couple of slides from here, I will point out that particular issue out and look at one of the actual air sampling data that will be out for discussion.

Go to the next slide, John.

Again, just quickly, you can read

what is on the slide but the focus here is the fact that the intentional exposure for or the exposure associated with these three actinides, in the absence of the mixed fission products, will be then on the basis of alpha activity that is measured in these particular air samples and using ten percent of the maximum permissible air concentration for these three radionuclides as a bounding value for internal exposure.

As you see here, there are three, basically, issues cited for uranium, thorium, and plutonium. But the point that I wanted just laid out here is that we are talking about, generally speaking, the use of ten percent of the MPC value of the air concentration that you would expect to see as the bounding value for some of the air concentration of an exposure to the three radionuclides uranium, thorium, and plutonium.

Let me go to -- the next slide provides some samples of the air concentrations

that we can expect to be used here. And I want to point out a whole number of areas that are important. This particular air sample data was taken, as you can see, on the upper left-hand corner, was taken at the FCF and it was in Room 25. And this particular slide as taken out of NIOSH's SEC Evaluation Report. And so I chose that one as an example to use for this presentation.

And what you will see here, there is a number of things. In the upper top left-hand corner you will see the actual date that this particular air sample was taken. It was taken in September of 1963 and you will see, obviously, a time frame. The 1420 represents 2:20 p.m. in the afternoon and the time off was on 9/18 at 1138 as is shown here.

For the entire duration of this air sample, it is next to that, it corresponds to 1,289 minutes. And when you translate that to actual hours, that is quite a bit of time of the duration.

Next, I guess I want to point out that the flow rate for that air sampler is just below that value and it shows that the actual flow rate for this particular air sample was one cubic foot per minute. You also see next to that the total value of 39 cubic meters were taken. And the data now -- I am going to switch to the bottom -- involved the fact that the air sample was monitored for beta/gamma and you will see at the lower portion what those values are, based on the time frame and the activity. It was 37 dpm per cubic meter. That was the combined beta/gamma.

And then you will see three different time frames for measuring the alpha that starts out at 27 dpm per cubic meter and then goes to 14 and ultimately to 4. And there are three time frames, 15 minutes that corresponds to the 27 counts per minute, then there was 240 minutes that correspond to 14 dpm per cubic meter and after over 1,500 -- 1,513 minutes you end up reducing the alpha count to

four. And that is the issue that I have just mentioned. You have to wait that long when you talk about thorium in order to get rid of some of the short-lived alpha activities that you have to rely on.

I guess I will go to the next issue. Also, when you look at the top right-hand corner you will see the alpha activity and then you will see the values that the three counts per minute of alpha activity at 1,512 minutes post the collection time corresponds to, obviously, an alpha activity that is always considered to be less intensive than of the MPC value.

And when I looked at the data and I have to inform you that this particular data point, this data sheet was one of 11 routine air samples taken during the month of September 1963, along with three special air samples which selected because that is one of the thorium floor spill in Room 25 on 9/18/63. And all these particular air samples that are

valued, in addition to other ones that are not mentioned in my report and I am not going to get into here.

But one of the things that I wanted to point out is that these particular air samples do comply with what NIOSH has stated in their assessment reported in the SEC Petition Evaluation Report is that when these air samples were routinely evaluated, the actual air samples were consistently below the ten percent MPC value. And on that basis, NIOSH concluded that the use of the ten percent MPC value would, in fact, be a bounding assignment for personnel exposed to uranium, thorium, and plutonium without the fission product as a surrogate value. It is a bounding value.

And on that basis, we conclude the following. Go to the next slide, John. And you can read it. I will just mention although most of the reported air sampling data for the ANL-W typically showed values below ten percent of the MPC air, SC&A questions whether these

fixed air sampling data actually represent levels of their contamination breathed by the workers themselves, as opposed to just an air sample.

And the assumption that the measured air concentration from GA air sampling represents air concentrations respired by workers during facility operation, has to be questioned at two levels and that is really what I want to talk about today. One, the long air sampling times and two, the limitations and uncertainties associated with general air sampling in order to assess people's exposure from these particular data.

And let me just briefly go over what the other air samples that I mentioned for the month of September in 1963. For the general routine air samples, the flow rate of one cubic meter per minute corresponds to approximately 1.7 cubic meters per hour, which is really only marginally greater than the respiration rate of 1.2 cubic meters per hour that we generally

assume for a given worker.

So, that in order to sample a sufficiently large volume of air, sampling times during the air sampling measurement that was taken for the ones that I assessed for the month of September at Room 25 of the FCF, the average times range from the low value of 1,289 minutes, which corresponds to 21 and a half hours, up to 5,690 minutes or essentially 95 hours with a mean duration of 2,400 minutes or 40-some hours for any given sample in that particular set.

So, when you look at that data, you come to some understanding as to what may be the problem. And one of the things that I did check was exactly which day of the week of a given week that they were taken. And when I looked at the 11 air samples that were part of this particular sample set, at least three of them were initiated on a Friday and terminated on the next work day. In two of the cases it was the following Monday.

The longest length of time for collecting that air sample which I mentioned was 5,690 minutes for essentially 95 hours. Actually, I looked at the calendar and I found out that that, essentially, corresponded to the four-day time period that corresponds to the entire Labor Day weekend in 1963. And on that basis, I came to the assumption that, and it is an assumption I think that is relatively safe to make that these time frames, even a single time frame of 24 hours would, in essence, correspond to eight hours of work time at the facility, operational time, and at least two-thirds of that 24 hours or 16 hours would not, in the case of the one particular case where I identified sample time that involves 95 hours and the entire Labor Day weekend. One would assume, essentially that air sampling data corresponds to time when the workers were probably not there and work, operational work that would potentially contribute to airborne activities was essentially reflecting time of

not purely operation but basically of downtime.

And so the thing that I felt was an issue here was the issue of the long time, the long air sampling time which corresponds to time periods during which there was not any operation. And when we talk about operation, we talk about not necessarily people being there but people who are doing activity that would contribute to the release of contamination in air in the distribution.

So, the issue that I wanted to discuss here is the concern that I have regarding the long sampling time and the fact that much of that time represents time periods during which workers who were engaged in general operations were probably not present.

Now, I think Bob Barton can talk a little bit about some of these things that he checked into. And I believe, if Bob wants to talk about it after I am done here, we can talk about the type of activity. That is one of the things that I do want to point out. There may

be have been people present during non-operational time frames, that is time frames that are not part of the Monday through Friday, 9 to 5 time slots but perhaps afterwards or even weekends. There may be people there and I am sure there are records that would suggest that people were there during these time frames but they were probably not people that you normally consider as being operational people.

For instance, it might be that you have a lot of people there who have doing work in the absence of the operational time such as health physics people who were doing air sampling or other sampling kinds of situations that are not necessarily considered operational. So, I will state the position that the sampling time of air monitoring data values being used or at least projected to be used for assessing internal exposure may correspond to, in large part, periods when operational activities did not exist.

The second issue that I think needs to be look at, and that is a much more important one is in the next slide. And that involves the actual use of general air sampling. We all have talked about this in other situations. We really have two types of air sampling that we can rely on for measuring air contamination levels. One is the general air sampling that is usually at a fixed location in a given area that may be a very large area and, therefore, you are only taking one point space for sampling the air. And the other one, which is one that is usually preferred, if you really want to assess the contamination that is being breathed in by workers, is the personal breathing zone or BZ air samplers, which are devices that are worn by the individual worker where the filter is located on the lapel and the air that is being assessed is essentially in proximity to the area that the individual is breathing at any given time. And as we know, when you introduce

a contaminant into an environment, usually it is something that is not uniformly dispersed but they are usually, depending on distance from that source term, there is a greater concentration that is very significantly over both space and time. And so it is not just the kind of thing that we have been studying based upon a personal BZ air samples to general area air samples that shows that there is usually a poor correlation between what you actually measure by a GA air sampler as opposed to a BZ air sampler.

And what I want to show in the next several slides is that the studies that I have looked at seem to support that particular concern. And the studies that I will show you in a couple minutes are two studies that were published, and it is important to note the time frame, it was in 1967. Both of these studies were published in 1967 and that particular time frame corresponds with the issue that is our concern here with it used for air sampling data

that is surrogate for actual bioassay data for the three actinides.

And both of these studies involve nuclear facilities where workers were exposed to uranium and thorium. The first study on the next slide involves the study that was done at the Windscale/Springfields Works of the United Kingdom, the Atomic Energy Agency.

And just a summary, the position that they took was that the air samplers were invariably consistently greater than the integrated exposures that were identified from the GA samples. And they said the ratio of values between BZ and air samplers was something that was consistently shown that the actual BZ samples were higher, invariably higher than was assumed from the actual GA samples.

In the next slide, you will see examples for the plutonium laboratory. Here, you have the scatter diagram that shows on the y-axis you have just strictly the ratio between

the activity divided by BZ measurements as a ratio to the activity that was measured by the fixed area air samples. And you see that the values range essentially from the ratio of 0.1 all the way up to 10 to the third. And you have to realize that the ratio, therefore, is the log scale because when you look at these x-axis result, the values there are indications of the actual average disintegrations per cubic meter hours for the BZ. That is considered the more active value.

So, what you are seeing is how the ratio between the activity measured by BZ samplers over the general air samplers on the y-axis increased as a function of the actual air concentration that is measured by the BZ on the x-axis.

And there are a couple of a things here that I need to point out. When you look at that for most data points that are shown in this particular -- and this is for the plutonium facility, for most data points, the

ratios of the BZ air concentration to GA air concentration is greater than one. The BZ samplers measured higher worker intake than would have been associated with GA samples.

For instance, when you look at the data set here, only a small number of data points reflect ratio values that are less than one percent, which GA samplers would have predicted higher worker intakes than the BZ samplers. And what you see is that the difference between the ratio increases as a function of the air concentration is measured.

So, when you look at the data here, on average, the people at the UK facility generally made a statement that if you have to rely on GA samples data as an approach to at least estimate what the workers would have been exposed to would be to multiply on the basis of these data the GA sample data by a factor of ten, at the minimum, to say what on the basis of the GA samples would you expect the BZ samples are yielding in terms of air

concentrations.

And by and large, the results for both the uranium and plutonium areas investigated shows that fixed air general air samples are, for the most part, incapable of indicating the true exposure to the operators and a multiplier of ten was their recommendation to correct that particular issue in the absence of BZ air sampling data.

The second study that I want to briefly point to was the one that was also taken, as I mentioned or issued in 1967 and it involved the Nuclear Materials and Equipment Corporation. John, can you go to the next slide?

And I think most of us will recall the NUMEC facility is also the AWE facility with 700 workers. And there we saw an approach of a comparison between BZ and air samples shows a similar pattern. But the study that they conducted involve 594 BZ samples at the plutonium facility and 459 BZ samples at the

uranium plant.

And most of these data sets were compared to the GA sample data both in time and location. And in this case, the BZ samples and the general air samples were only operated during actual operational time frames, not beyond that. So, in most cases, those were normal hours of an eight-hour shift.

The next slide shows one of the samples that are part of the plutonium data. Again, you have on the y-axis the ratio of BZ to GA samples and you realize, for instance, when you go to ten, what that means is that at that point, and this is within the lower rate range, the factor of ten says that the GA samples would have under-predicted the BZ samples by a factor of ten and as you progress further up the line that is there, the center line, you will see, obviously, data where the ratio shows that ratio values where BZ samples was considered the true exposure, it is 100 times higher than the GA samples.

Also let me point out that one of the things that was discussed in this particular study is the high variability of the BZ to GA ratio for any given BZ air concentration. When you look at, for instance, the first column of data where you have the value, the BZ value concentration that ranges between 40 and 50 dpm per cubic meter, that is in the first block at the lower left-hand side, you see dots there that go all the way from near zero to all the way up to 800 times higher. In other words, where you had air concentrations measured by BZ air samplers, the GA data would have been we find that ratio that ranged everything from essentially near zero all the way up to 800. In other words, you cannot -- they conclude you cannot conclude that a value of ten, as the UKAEA recommended, if the driver means a lower concentration because of the high variability.

Secondly, as the BZ air concentration increased, and again, as you see

here, there is an upward trend that would increase between the BZ and the GA ratio so that, for example, the BZ is between 4 and 480 dpm. If you move slightly to the right and you look at that column, there is only a couple of points there, the fixed air concentration varied from about 100 to about 300 of the BZ concentration. Again, when you realize the high variability that the GA would under-estimate the actual air concentrations, it would have under-estimated by a factor of 100 up to 300 to get that rate of high air concentration.

And thirdly, the line that is a solid line, that particular solid line this figure represents the line where the fixed general air samples which indicate the soluble MPCa value for plutonium. And above the line the GA value was less than the MPC and only below the line indicated that it had an air concentration. In other words, this is the error that you would introduce if you only

relied on the actual GA air sampling to warn people that at least to your knowledge if a situation where the MPC level has been exceeded. In that line we find the dividing point where that error then would have occurred in terms of warning workers that the MPC level has been exceeded.

But let me just quickly go to the other study here and that involves uranium at NUMEC. And I will just briefly, it doesn't mention it there but 409 BZ air samples that were matched against GA values and, again, here the majority, and that is essentially 73 percent of the time the GA sampling network failed to warn personnel that greater than permissible exposure conditions existed. And I will point that number out to you in the next slide, where you see what the 73 percent represented.

If you look at the far left column, you will see the differences in terms of numbers when the BZ in the first line, the BZ

was greater than MPC but the GA was less than MPC. And you see out of the 469 samples that were matched against the GA, 300 showed values that were greater than MPC when the GA sample would have predicted less than that.

In the next column, you have the BZ again showing greater than 10 MPC and none of the GA samples that you were afraid of in MPC. So, again, there is a factor of ten difference in 33 of the matched samples.

When you go to the next one, that is the only time that is when out of 54 examples that were actually GA which showed a BZ value that was less than MPC also had GA samples that were less than MPC. And in only two cases, where you have the flip-flop or the opposite arrangement, where out of two samples BZ that show less than MPC, GA would have predicted something higher than MPC.

And lastly, you have 70 samples that were matched where the BZ is greater than MPC and GA is greater than MPC.

So, again, you realize that the differences between the various sample measurements that represent higher BZ values, as I said, out of the 459 matched pairs, 73 percent of that is the 300 plus the 33 that represents, but by and large, the 73 percent value that says you would have been very definitely under-estimating worker exposures.

And in the final slide, again, the summary conclusion is that when we considered the use of ten percent MPC value as a bounding value that would estimate the exposure to workers based on a general air sample, you have to look at it in context with empirical data which suggests that the potential for using the GA data may seriously underestimate the true worker exposure, had it been measured in terms of BZ air samples.

And the statement that NIOSH had introduced into the SEC Evaluation Report that this would be a bounding value because most of the air sampling data that was based on alpha

activity by means of a GA samples were less than ten percent MPC has to now be questioned, in light of the issues that I just showed you with regard to the two studies that show that ten percent MPC is maybe not the true meaning, especially if you multiply a factor of not only ten but up to 100 or even greater so that it is not a bounding value.

And on that basis I think it is our conclusion that use of general air sampling and assigning a ten percent MPC value as a bounding value is really something that we have to raise a question about in terms of its credibility.

I guess that pretty much covers what I wanted to say.

MEMBER BEACH: Thank you, Hans. Before we get to questions, did you make that slide show available to everybody or can you?

DR. H. BEHLING: Yes, it is part of the paper, the White Paper that I issued --

(Simultaneous speaking)

MR. STIVER: That was subtask five.

DR. H. BEHLING: It should be. If it is not, I think this will also be presented at the end at the full Board meeting. And so I don't know what you have available right now but you will probably receive a copy of this particular presentation at the full Board meeting next week, I guess. And that should be a handout as well, I believe.

(Simultaneous speaking)

MEMBER BEACH: So, thank you. Yes, I do have your report. I just must have missed that part of it.

Any question for Hans?

CHAIRMAN SCHOFIELD: I have a quick question for you, Hans. How well do we know the configuration of their air monitoring program, where they just put a fixed head for every so many cubic feet of floor area or were they portable fixed heads, giraffes that can move around?

DR. H. BEHLING: Yes, again, I don't have a full understanding but the data set that

I reviewed and there multiple data but the one that I chose for this presentation was in fact cited in the NIOSH SEC Evaluation Report. In fact, this particular sample that I used as one of slides which occurred, as I said, on September 17 and 18 was illustrated in the NIOSH report and you set it as an example.

And I believe all these particular air samples were probably portable air samples but they were, obviously, taken into a facility, in this case Room 25 of the FCF, and they were left for 24 hours and, in one case like I mentioned, over a four-day holiday weekend over a Labor Day of 1963. And I assume it was not moved about; it was essentially there in a fixed location. It may have been a representative location, a central location but again, as I have said, one of the things that was identified in both of the studies, both the UK study and the one at NUMEC is that even when you have a group of workers at a given area that is being monitored by a single GA sampler

and then you compare separate workers who each wore a BZ, you will see not only a major difference between the average of the BZ sample data and the GA but if you just look at the actual independent BZ, at any given let's say eight-hour work time period, if we had ten people wearing a BZ and you compared the BZs and they were all in the same area, which in the absence of their BZ would have now been assessed by one single GA counter. But if you look at the ten different people's air sample, they also varied significantly.

So, in essence, you realize that the exposure that people are exposed to, even for a given area, will vary among individuals because of their location, their movement, whatever it is. But you cannot rely on a single GA air sampler and say one size fits all because that is also demonstrated by the fact that people within that given area for the same time period, when you compare their BZ data, they also vary significantly by large factors, by a

factor of ten or even more.

So in essence, what you have to conclude is that the BZ samples are unique to the individual. And what is shown here is strictly the average BZ as opposed to the individual GA sample.

And as I said, you can obviously come to a conclusion that a GA sample is maybe has some limited value but cannot be used as a replacement for actual air sampling involving the given individual. And then in response to what was recommended by the UK, even a factor of ten might not be adequate as I showed you at the NUMEC level. At the lower end of the spectrum when you have less than 80 dpm per cubic meter, the individual ratios between the GA and individual BZ samples were a range as high as over 800-fold difference.

So, you realize what the problem is. And if you assume that ten percent MPC value, is a bounding value, I think you have to raise questions based on these data.

DR. MAURO: Hi, this is John Mauro. We have discussed this before and I think it is something that is worth raising here is that I think one of the reasons that we are seeing this has to do with the type of work the worker is are involved in.

And when we discussed this, one of the thing that you pointed out to me is that if you have a worker that is working let's say he is grinding something or there is a pinhole leak in let's say a glove box, where there could be a very localized release occurring, and he is, himself, working not far from where that localized emission is occurring, the aerosol is being generated, that is when you run into real problems between what the localized BZ exposure is, concentration and the GA.

However, there are other circumstances where the nature of the activities with the one where you don't have this type of localized exposures but things are

more or less uniform as might very well be the case like during the residual period, when the kind of airborne activity you have is due to things like resuspension, which is more of a general, where let's say a general air sample be might more representative of individuals.

Do we know, in the examples you have given here, which are an incredibly powerful story, whether or not the types of activities that would be ongoing were of a nature where, yes, the workers were working in places where you would expect them to have localized high concentrations? Do you see my point?

DR. H. BEHLING: Yes, and I get that in Room 25 was where they coded some of the materials, the thorium. And I would expect that to be a very highly localized source term. And any time you have multiple and maybe localized source terms, the potential gradients exist and they will vary, obviously, extensively from one portion of the facility, a room that you are trying to cover with a given

single general air sample will vary significantly. There is no doubt in my mind.

But we are not talking about a residual period here where the source term may be a more or less uniform contamination of the floor that is subject to resuspension and, therefore, may have a more uniform distribution, as opposed to what was being monitored here in Room 25. And I am only using that as an example. I am not saying this is necessarily the same for all.

But I guess one thing that has to be stressed is that, as a rule, and this is the conclusion that the people of NUMEC came to is that you have a very difficult in trying to come to the assumption that a GA sample can properly protect workers from exposure, even when you are limited to an air sampler that signifies the concentration as being above MPC level. You will fail to understand that threshold in a number of instances, in a large fraction of instances, based on BZ air data

that you have just exceeded MPC and the general air sample would not have recognized it. That was the data I showed with the plutonium facility at NUMEC.

And so when we come full circle, there were two issues that I addressed in my write-up. One is the very, very long collection time of air sampling that in the minimum time frames involved approximately 24 hours and in a maximum time frame, involved, as I said, the four-day weekend over a holiday in 1963. And one has to question now when you take an air sample of a building that is more or less in a quiescent state, there is no workers going around, there is no operational activity that would potentially increase or change the air concentration, the air concentration measurement during that time would be at the absolute minimum, as opposed to activity levels which potentially introduce or resuspend activity during normal operational hours. That was the first issue that I

identified.

And the second issue, the generic limitations we have all known that the GA air sampling data are not necessarily going to give you the exact exposures of individual workers because of the contamination gradients that can be very, very significant and sometimes vary by orders of magnitude.

CHAIRMAN SCHOFIELD: Okay, are you done there, Hans?

DR. H. BEHLING: Yes.

CHAIRMAN SCHOFIELD: Okay, Tim.

DR. TAULBEE: Okay. Well, we will prepare a written response to this report. Just a few notes that I would like to point out and remind especially Work Group Members who participated in the interviews, we have asked numerous RCTs about the positioning of these air samples. And one of the comments that they all indicated was that they tried to position them, whether they were portable or whether they were fixing them in the stream from the

work to where the exhaust was so that they would be in the flow of the -- in the air stream, effectively, with the intent of trying to maximize. And so some of the air samples you will see are right there with the grinding type of operations with uranium.

In Room 25, the thorium room, it is not a very big room. It is in there. The molding operations were in there. That is one of them that we believe to be positioned to where it would be representative. So, is it BZ sampling? No. Is it GA sampling like in the examples that Hans has pointed out here? I don't think so. The operations in these other areas here are much larger facilities, much more -- well, they are just much larger than what these rooms were where we have the issue with the thorium, as well as the uranium and small amounts of plutonium.

So, from our initial standpoint is that it is somewhere in-between what Hans has pointed out here. And certainly the initial

part of some of the work time not being in there, that is something that we will consider and use. But like I said, we will write a formal response up here.

So, those are some of my initial thoughts.

CHAIRMAN SCHOFIELD: Can I ask one other question?

DR. TAULBEE: Sure.

CHAIRMAN SCHOFIELD: I believe it was about the early to mid-'80s the UK put out a paper where they did a fairly in-depth study of this at Aldermaston, general air sampling versus personal monitors that they would wear on the belts and have it connected to their lapels there.

I know the bottom line of that study was they went from general air sampling to all personnel who worked in those areas had to wear personal air monitors. I was wondering if you have seen that study? I would be curious to see if --

DR. TAULBEE: I have not. What is the name of the facility?

CHAIRMAN SCHOFIELD: Aldermaston.

DR. TAULBEE: How do you spell that?

CHAIRMAN SCHOFIELD: I don't remember right off the top of my head but basically it is the sister facility to the plutonium facility in Los Alamos. They took those blueprints. They built one there. They did improvements upon the facility where things failed, where things didn't work quite right.

DR. TAULBEE: We will look at that.

CHAIRMAN SCHOFIELD: Okay.

DR. TAULBEE: But I mean just to try and reemphasize, this is a pretty small pilot plant. If you haven't been there, you should take a tour of it, to walk around where the hot cell is and to see Room 25 off to the left as you are walking around the circle. And then the room that they were using temporarily before the -- what is that name of that building, the fuel --

MR. FINDLEY: The fuel cycle facility?

DR. TAULBEE: Yes, maybe. The new one that they built to do the uranium work when they moved it from those rooms.

MR. FINDLEY: The FASP?

DR. TAULBEE: FASP, yes. So, I would recommend that you go and do that because it is not this huge large plant that you are thinking of. It is not that at all. This was a pilot test facility to show that you could reprocess fuel internally. And during that time period, 1963 through 1967, for the thorium, anyway, in Room 25, until they got a better method of coding the molds, that is what they was what they used in that room and they took air sampling in that to control the air or to monitor it for the workers.

MR. BARTON: As a side note, Google seems to think it is spelled A-L-D-E-R-M-A-S-T-O-N, Aldermaston.

MR. KATZ: If we're done with that,

we should just look at our path forward for the day today because it is noon now. I just want to figure out what you want to catch when, if you want to get another agenda item in before we break for lunch. Lunch here is notoriously slow to actually get fed, if you are trying to get fed here. We will probably need an hour break. And again, we have to break at 3:30, no later.

MEMBER BEACH: So, is this a good lunch break then are you thinking?

MR. KATZ: Well, it is just a question. We were going to look at the agenda and see what -- or SC&A give us some advice for what we can get done when.

MR. STIVER: Yes, I would say that the two big things we need to look at are Steve's reactor prioritization and then Ron's cesium/strontium evaluation.

MR. KATZ: And how long do you think Steve's --

DR. OSTROW: Ted, my two

presentations, the INL and the ANL, you know, the presentations together, they shouldn't be more than half an hour.

MR. KATZ: Okay, good. That's helpful.

DR. BUCHANAN: Yes, this is Ron. My presentation won't be long. I will give mostly an overall view of the three papers that I have submitted but I won't go into great detail.

MEMBER BEACH: So, is that something we can do maybe between now and 12:30 and do Ron's before lunch, unless you guys are ready for a break.

(Simultaneous speaking)

MR. KATZ: So wait, so what are we doing?

MEMBER BEACH: I was just wondering.

MR. KATZ: Are we doing Ron's and then lunch break?

MEMBER BEACH: That is what I was wondering.

MR. KATZ: And then move to Steve's?

Is that what we are saying?

MR. STIVER: That would be fine.

MEMBER BEACH: Would that work?

MR. KATZ: And close with Steve's?

CHAIRMAN SCHOFIELD: That would be only a half an hour after lunch.

MR. KATZ: Yes, well whatever response and discussion there is. Well, you can go on from there for sure until -- we can run the clock down.

DR. TAULBEE: I guess I would prefer to break for lunch now and then do Ron's and then Steve's so that we could have a little bit more time to respond. If we did the half hour now, then we won't really have any response and I do have some questions for Ron.

MR. KATZ: Okay, that's fine.

So, then let's break now. And please, so it is noon now. Let's keep it to an hour. We can tell the folks here that we need to scram.

And if everyone else will be back on

the line in time to start at one, that would be great.

MEMBER MELIUS: Okay.

MR. KATZ: Thanks. Okay.

(Whereupon, the above-entitled matter went off the record at 12:04 p.m. and resumed at

1:02 p.m.)

MR. KATZ: Okay. So we've got all our Board Members back, and we can get rolling.

CHAIRMAN SCHOFIELD: Okay. Let's see. It's going to be -- Bob is up next, right? Ron.

MEMBER BEACH: Who's going first?

CHAIRMAN SCHOFIELD: Ron.

(Simultaneous speaking)

MR. KATZ: Ron, are you there?

DR. BUCHANAN: Yes, okay. Good to go.

MR. KATZ: Yes, thank you.

SC&A's Evalution of Cs-137/Sr-90 Values and Actinides Using INL Waste Reports in Relation to Assigning Intakes

DR. BUCHANAN: This is Ron Buchanan with SC&A. And what we're going to look at, I'm just going to give you a summary of three reports that I had issued, one in November, one in June, and another one in July. First, it was for Idaho, and the last one was for Argonne National Lab-West.

And the way this came about was that when we started looking at the site, the Idaho site, they had many reactors and a lot of different operating conditions and various source terms compared to other sites we've looked at because the recommendations mainly used at the other sites a similar method where you use an indicating radionuclide, such as cesium-137 or strontium-90 from a bioassay to determine the intake of the fission activation products, the FAPs, for the actinides, which are your alpha emitters, your plutonium, thorium, and americium, and such.

And so I looked at this to see if there was some, you know, reasonable match between what was recommended and what was actually measured. And when I got looking into it, I found that the fuel that was actually processed there in the year 2000, DOE wanted Idaho to give them an idea of the RU, the recycled uranium content and uranium product. And at that time, they stated that there had been a lot of analytical measurements made on the fuel in the different processes, but due to record-keeping practices, they were no longer available. And so even Idaho had to go to a computer program using ORIGEN as the basis and the root of that where you simulate what the elements you think are in the fuel element.

Now, you have to realize that, also, Idaho received fuel from other sites, Rocky Flats and also Brookhaven. So not only do they have all the different reactors, but we had material coming in from other sites, too. And so what I looked at was, when I started looking

at this, I said, well, there's not much information on the fuel, the ORIGEN runs have been made, but I'd like to look at some benchmarks, you know, actually measurements done, the quantitative analysis of the radionuclides, to see what it shows. We know they're not going to match exactly because of experimental issues and such, but I want to see if, you know, it's a reasonable match.

Now, what I did find when I first started looking at this is that there's very little quantitative data of paired radionuclides and especially in early years. And then when sodium iodide and such came in, they started doing more quantitative analysis. But then again, he's interested in one thing, usually strontium or cesium or some other product, and so it was hard to find matched pairs. And I was looking for, like, cesium-137, not just cesium, or strontium-90, not just strontium, to really see that the ratios, what they were with that radionuclide that we were

concerned with in OTIB-54 and the tables at 522 and 523 of TBD-5 for Idaho and Argonne. And so that eliminated a lot of the data because it didn't have quantitative analysis.

I did find some, though. Now, we have three major compartments here. We have the fuel as it's cut open or dissolved and what could be in the fuel. Now, we also have the general environment, what gets out into the environment, what's the smears, what's the air samples, what's the soil, water, air, in the workers' environment, not out in the general public but in the workers' environment. And then we had the third compartment is the worker himself and what the intake is. And so, of course, breathing zone and, just as we've heard already this morning from Hans, he had a gave a very good report on breathing zone and also nasal swipes are a good indication of what's being taken in.

Now, the bioassays didn't prove to be as useful because most of them were less

than detectable or a whole-body count would just say natural or background. So it didn't give you much information. Very few had isotopes greater than the minimum detectable, and, if they did, there wasn't anything to match it with usually. And so I'm kind of limited to that middle ground of the workers' environment. And I'm not saying that this is better information than what's being recommended. I'm just saying these are some of the benchmarks I looked for, and I'll present a summary of the results of those three reports. And these spanned samples I was able to find some quantitative analysis on, spans the time period about 1960 to 1990, so a pretty good span. And it spans several of the different facilities at INL and also Argonne, and so it gets somewhat representative.

Now, I did not include any data there in the SEC period at the Chemical Processing Plant because that's the whole reason of the SEC was that the ratios wouldn't

hold. And so I eliminated that from any data set I took.

MR. KATZ: Ron, Tim has a question.

DR. TAULBEE: I have a question about that. The reason for the SEC was that the ratios don't hold for the actinides. The ratios still hold for all the mixed fission products, and we are still planning to do dose reconstruction for those who do not, who are not part of the SEC due to their cancer type to use their bioassay and these ratios to those people at CPP.

DR. BUCHANAN: Okay. That's good to know. Now, eliminating that data didn't really change my results, but we'll keep that in mind.

Okay. So what I wanted to look at first of all was the strontium-to-cesium ratio because, in both the OTIB-54 and the TBD-5, it's based on the assumption that the ratio is about one. Now, again, you know, it's not going to be exactly that, so I said, okay, well, if it's 0.5 to 2, let's look at that.

We'll give them a green spot if it's 0.5 to 2. And in these three reports, you'll see there's a number of plots, and what I did is I plotted the measured value for cesium and strontium or strontium to cesium. It should be around unity, so it doesn't make any difference which ratio you use. And gave it a green dot if it was 0.5 to 2. You could do, you know, 0.1 to 10, whatever you want to choose. I just chose that as reasonable experimental error.

And then for the fission and actinides, what I did was look at the recommended ratios for strontium or cesium and I took the measured value that I found, divided it by the recommended value. So if the ratio was around 1, 0.5 to 2, that would be an acceptable ratio, and so the measure would pretty well match the recommended. If it was greater than 2, well, then the measure showed a greater concentration than the recommended and a person would not be in as much dose as they should have. If it was less than 0.5 and the

measure was less than what was recommended, a person would receive an over-amount of intake compared to what they received. And so this holds for the fission activation products and actinides when you use an indicating radionuclide.

So looking through the data on the Site Research Database, and this is the last six months or so, over a period of a year really, I found about 250 matched pairs for cesium to strontium at Idaho and about 33 percent of those agreed within .5 to 2. And this was information from nose swipes; urinalysis, which there wasn't much information there; fuel element scale, which was at Brookhaven Graphite Reactor scale, fuel that was crushed there, fuel storage, contamination swipes, air filters, liquid, solid soil and air waste from Idaho and Argonne waste records, and that's where I found most of the data. And, really, the waste is a step closer to what the person is exposed to it is compared to what was

in the fuel element. It might not be exactly what he takes in because it's on such -- you know, even air filters don't represent everything, but I wanted to see what the ratios were. And so the cesium and strontium, about 30 percent for Idaho; and for Argonne, there's about 66 percent matched to a factor of 2. But I only had 20 samples from Argonne. Argonne didn't do much quantitative analysis, and so that's an area that, you know, perhaps there's more data there. We'll discuss that in a minute.

The cesium activation to cesium or strontium, I had about 25 pair for Idaho, 15 pair for Argonne. And they were in the few percent, 5 to 10 percent match, because there wasn't a whole lot of data. And for each one, like cobalt-60, there might have been only three points for something else or it might have been five points. So there wasn't a whole lot of data matching there.

The actinides had about 60 points

for Idaho and about 17 points for Argonne. And, again, you had a fluctuation. You had a couple of green points that were, you know, around the unity, and then you had some below and above.

Now, the main thing on the below and above, if you look at these reports, you'll see a number of plots and I don't want to go through all those today, but just to tell you when you look at these reports that some of them range fairly large, you know, some of the actinides especially. It might be an order of 100 or 1,000 or 10,000. And same way with cesium to strontium. And so the issue there is, even on the cesium and strontium, if two people were working with the same material and had the same intake and the strontium and cesium weren't approximately equal and one was bioassayed for strontium and another bioassayed for cesium, they'd be assigned different values of dose because the mix in what they was working with wasn't around unity.

And so this is where I'm at at this point. And like I say, this is detailed in those reports. And so, at this point, there's three levels, you know, that we could look at. It would be useful to find some fuel data to compare it to, and I know that Steve is going to talk about the reactor prioritization here in a little bit, and it would be useful to see how the ORIGEN runs duplicate some actual data that was taken that could be found. It doesn't really represent what the worker was taking in, but it would be useful.

The second is if more work environment data could be found like I mostly analyzed so far, except that INL didn't have very many data points to work with there. And, of course, the third one, the best thing is if we could find more nasal and breathing zone data that is a direct indication of what the worker was taking in.

And so, at this point, that is where I'm at on this investigation, and I'll open it

for questions.

MR. KATZ: Thanks, Ron.

DR. TAULBEE: Ron, in looking through the data, I do have a question for you. This is one of the reports that I have looked at a little more closely than some of the others. I had noticed that, in some cases, you selected annual data instead of monthly. Was there a reason for that?

DR. BUCHANAN: I don't know which data you're talking about, but, generally, I had to take, well, on some of the air data, the waste data, I felt that this was more representative than trying to plot all the individual monthly data on the waste data. That could be done. I think you'd get similar results. In fact, you'd probably get more fluctuation than doing the average, but the idea was it would give us more indication on what happened over the year. It could be done on a monthly basis. I think you'd see similar averages, just more scatter.

DR. TAULBEE: Okay. Well, I guess, from my limited review of this, I'm not sure that we're going to see more scatter. I do think, well, some of the data did surprise me where I did go through and break out some of the annual data. It just seems like there's a mixture here. In the 1960s, the data was kind of reported on a monthly basis. And then when you get into the latter years, the 70s and the 80s and 90s data that you used, you kind of switched to the annual. And I've seen it go both ways in the analysis.

In one particular case, the ratio of 144 dropped down to 1.73 when you take an average of all of the values. But then in another case where the ratio you've reported is 2.33 and the combined average goes up to 14.55.

So I think it will go both ways, but where I'm mostly concerned is some of the upper tail or the extremes within your analysis. In particular, the one ratio of 2,587. That is one where, if you go through the data and you

look at just the monthly component of that, the strontium, those aren't reported for any of the months, except for one month, during that year. And so when you pair that one strontium measurement to the paired cesium measurement, that ratio of 2500 drops to 6. And so that's where I'm concerned with not using all of the monthly data in a uniform manner.

So I would recommend that that be done. I mean, if you want us, I mean, if that's something you want us to do in our response, we can. But, you know, if you're looking to build on this or to analyze other things, I would really ask that you consider that because I think some of the variance that we're seeing on the extreme side is possibly due to that. I will say not all of it. The next highest result is 550, and that one is legit. That's a monthly analysis.

But this gets me to my next question of, in the ANL report, you looked at other radionuclides, like cerium-144, and compared it

to OTIB-52. Are you planning to do that with this one? Because that one result where I just talked about the 550 for strontium, the other radionuclides are all stable associated with the cesium. But then if you ratio off of the strontium for that particular month, yes, they're higher. But the other months are more in conjunction with what the cesium was, so it seems like that that's just kind of an outlier measurement, which is okay. That's going to happen when you have a large data set.

So my question is are you planning to look at other radionuclides and compare it to OTIB-54?

DR. BUCHANAN: I looked at all the radionuclides that were available. So many of these -- it's been a while since I did it, sometimes there was, some of these months there wasn't both of them available. Other times, they didn't analyze for everything every month. And so sometimes I didn't use that data. It didn't have enough radionuclides quoted. And

the cesium activation products, unfortunately they don't do a breakdown very often, usually cesium or strontium. Sometimes it would just be strontium and not strontium-90, and sometimes it would just be cesium and not cesium-137, so I didn't use that.

So I used all that I had seen were valid specific radionuclide values that I could use to determine paired ratios.

DR. TAULBEE: Okay. For that paired ratio. I'm meaning other radionuclides to compare to OTIB-54 from the standpoint of the zirconium, strontium-89, cerium-144, ruthenium-106, because those are all typically reported in these waste reports with the cesium and strontium values.

DR. BUCHANAN: Right. So that's the reason I used those. If they weren't reported or they weren't reported with cesium or strontium, I couldn't use them. And so any data I found or will find that has the paired information, I'll use with regards to what it

is. Now, some of the really short fission activation products, I don't know how long it sets, so I don't think I looked at anything less than about, you know, a little under a year, a half a year to six months. Anything less than that, I didn't know the conditions, so I couldn't do a ratio on it.

DR. TAULBEE: Okay. I'm not sure --

DR. BUCHANAN: I'll use anything I can find. If it was available, I tried to use it. And in the future, I'll use anything I can find. But if it's a short-lived, I don't do that because that really wouldn't be good ratio information.

DR. TAULBEE: I understand that. In doing, I guess, a different search of the SRDB, I did identify ten additional references that have this type of information in them. If I send you those references, will you consider looking at them?

DR. BUCHANAN: Sure will. Yes, anything I can get because that's a long

process finding those quantitative analyses with specific radionuclides. It's a long hard process finding them.

DR. TAULBEE: I agree. My next question has to do with your definition of the .5 to the 2.0. And I guess my reasoning for this is is that, did you consider looking at doses? Because in some cases, some of these resulting doses are very low. You know, if you've got a resulting internal dose of 10 millirem and here we're talking about 10 millirem versus 20 millirem, even if it's an order of magnitude, then it's 10 millirem versus 100 millirem, those are really not large doses when you consider the missed dose that we apply from external and from other things during the year. So I guess I would ask that you consider to look at the doses and consider expanding that range that you've got of .5 to 2 because I do think that that is important.

The final comment that I would make is that, when you take all of the data that

you've got, the median value is 2.1, 2.13 actually. And it actually seems to follow a log normal distribution. And I've got that plotted if people want to see that. I can pull it up on Live Meeting if you want, or I actually had a handout, too. But that's up to you all whether you want to see that or not, but it does kind of show that -- well, sorry.

(Simultaneous speaking)

MEMBER BEACH: Might as well. I mean, I don't know if Ron, Ron can't see it. But maybe --

DR. TAULBEE: Ron, do you have Live Meeting?

DR. BUCHANAN: Yes, I've got Live Meeting on.

DR. TAULBEE: Okay. I'll bring it up on there.

MEMBER BEACH: Well, and then back to your first point about adding or -- you asked if you wanted to do it, the monthly versus the yearly. You said NIOSH can do it or

SC&A can do it. Ron didn't really have a chance to respond on --

DR. TAULBEE: I'm sorry.

MEMBER BEACH: -- what his thoughts were on that, if it was something he could do or if it would be something that you would want Tim to do. Ron, I just wanted to make sure we didn't lose that point and you've had a chance to respond to Tim's first question there.

DR. BUCHANAN: No, I'd like to, I would like to address that because I think there were reasons I had for using the data points I did. And I can go back and look at the months that it has valid data and add that in. I would prefer to do that since I'm very familiar with it.

MEMBER BEACH: Okay. And there may be something, I don't know if a technical call would be in order for some of this stuff or if Ron is not finding the stuff that you think is available, Tim. I just --

DR. TAULBEE: Yes, that would be a

real good idea.

MR. KATZ: Yes. Well, and you can trade emails, if it's simple enough that you could trade emails. You don't even need a call for that, and then timing isn't a problem.

DR. TAULBEE: Are you all seeing a plot up on the Live Meeting?

DR. BUCHANAN: Yes, I'm seeing it.

DR. TAULBEE: Okay. This is all of Ron's data. I have truncated those above 50, 50 to 1. There's 15 data points that are off to the right that go all the way out to 2500.

MR. DARNELL: If you could make it a slide so they can view the screen. Only part of it is showing.

DR. TAULBEE: I'm not sure. It's not a slide. It's the top one on the handouts. Scroll down.

(Simultaneous speaking)

MR. KATZ: Everybody viewing can scroll on there.

DR. TAULBEE: Okay. I didn't know

that. Okay. But what this looks like to me is, clearly, a log normal distribution of the data that we see, which is actually very good and very comforting from my standpoint.

Now, if you look at a plot of it on a probability scale, which is what I have down here at the bottom. And, again, this is all of Ron's data. The geometric mean, I'm sorry, the 2.53 in this case with a GSD of 5.91. So, you know, it looks like about 80 percent of the data is less than 10 from this standpoint.

So there are some outliers up there at the top, but I think some are associated with the use of annual data instead of monthly data. So I do think that some of that upper tail will drop in a subsequent analysis, but maybe it won't. I really don't know because I saw it go both ways when I broke apart the annual data. So I think we won't know until that gets done, from that standpoint.

The final draft that I would show you is that, in looking at this and looking at

some other areas, and this is where I primarily was using CPP data a lot, Ron. And I didn't know that you had excluded that intentionally, but a large number of the data points were from CPP. So these are 60 additional data points not in the SEC analysis, and you can see it's not as linear and not a straight line as what Ron's plot is. But the GM drops down 1.95 and the GSD cuts in almost half. So I do think there's more data out there that give a more broad picture of the whole scenario here that I do think should be looked at.

And I'll be happy to share this data with you, Ron, as well as these other resources that I have found. And I think that's a good way to go.

MEMBER BEACH: So to move forward on that, you would exchange emails, Ron could determine what he might need, and you could provide that?

DR. TAULBEE: Absolutely.

MEMBER BEACH: And Ron can update

his White Paper, and then, NIOSH, are you planning on a response White Paper? Of course, not until Ron is done.

DR. TAULBEE: I would like to hold off on our response until -- if Ron is willing to update and consider this additional data, then, once that revision comes out, then, yes, we'll respond from that if that's acceptable.

MEMBER BEACH: That makes sense to me.

DR. MAURO: This is John Mauro. I have a question for both Ron and Tim. I'm sort of stepping back a little bit and thinking about all of this data, these ratios, where they break down and how they break down, where they were talking actinides to cesium or cesium/strontium. In the end, and correct me if I'm wrong, what we're really trying to do probe here is the validity of OTIB-54 in terms of a technique to reconstruct internal doses, and the idea being that these ratios hold up. That means OTIB-54 holds up.

If they break down and, apparently, you know, certainly looking at a spread on the cesium to strontium-90 that we're looking at here, I have, it's really more of a question. If they break down, the implications, I believe, are that your use of gross beta-gamma as your measurement along with OTIB-54 protocols, that you're going to somehow reconstruct dose incorrectly. And it's not immediately apparent to me whether the breakdown in the ratios means that you're going to overestimate the dose or underestimate the dose, and I think that's an important -- if what I'm saying is a correct perspective, I think that that context needs to be introduced into this work, the implications of these distributions. I realize you're trying to refine the distributions and use the data as best you can, but I, quite frankly, don't know what to use, how to use this information in terms of thinking about are we doing good dose reconstructions using OTIB-54 or not.

DR. TAULBEE: This is --

DR. BUCHANAN: John, let me respond to that first. If you look at plots in my report, you'll see that there's a band in the center, which is 1. And then if it's above that, if what we measured, and that's what the person was exposed to, is greater than the recommended value, then obviously you would underestimate the dose using a recommended value. If it was less than what the recommended value was then you would assign more dose using the recommended value than what the person is exposed to. And in this case, there's a similar amount of scatter on both sides of the unity line, and so, you know, roughly half the people would be assigned excess dose and half the people would be assigned too little dose. Now, I didn't do a mathematical analysis of how many fell above and below, but, just looking at the plot, it isn't one side, greatly one-sided one way or the other.

DR. MAURO: Oh, good. Thank you. That does help a great deal.

DR. TAULBEE: And if I could add on to that, that was part of why I asked the question about the dose and taking this all the way to dose at the end because OTIB-54 was designed to be claimant-favorable, reasonable but claimant-favorable. So the release fractions were kind of maximized from the ones that would deliver more dose than other fission products, which is why I think taking this data that you've got, Ron, and taking those that are above and calculating all the way out to dose both from the strontium and the cesium and then applying OTIB-54 to those, to both of those, and then comparing that to what the other radionuclides in that particular measure are. In these monthly reports, there is zirconium, ruthenium, strontium-89, and cerium-144 that could be compared then to both the calculated strontium dose, the final dose calculated based on a strontium bioassay and calculated based on

a cesium bioassay, and that's what I think should be compared in the end is that final dose. And I think it's going to be a little different mix, but that's just my impression because of the way we tried to maximize OTIB-54 from a dose standpoint and that's actually the input that goes into IREP is beta-gamma total dose. It's not, you know, cerium dose or strontium-89 dose.

So I think that really has to be carried all the way through, as you're suggesting there, John, as to what happens from this analysis of these two ratios being different.

DR. MAURO: I think that's a really important point because what -- as I understand, what you're explaining is, okay, we recognize we've got this distribution of values and it does go in both directions, which the implications are in some cases you might be high and in some cases you might be low, in terms of estimating the dose using OTIB-54.

And, of course, the ones that are high where you, the places where you would underestimate because the data are suspect, in other words the assumption of OTIB-54 has been shown.

I think we're in a very important place here. It's clear that there is quite a distribution of values that seem to offset to a degree, but that would mean for at least some of the workers, using OTIB-54, you may be underestimating, which brings me to what I think is how you close the circle. When that happens and you actually wanted to reconstruct the doses using OTIB-54 and then you say but if we correct for, let's say the fact that there's this uncertainty in these mixes, we're going from 1 millirem per year to 3 millirem per year. And so it means that the difference makes no difference. I think that's a very important point.

But in the cases where the differences do make a difference, and, of course, this is a subjective answer, but that

context that the OTIB-54 approach is what I consider to be an innovative and a very thoughtful way to come to grips with a very difficult situation and the fact that some of the data is not holding up in terms of ratios, if you could couple that with a demonstration that when we actually do apply to real data we're still talking about doses that border on the insignificant. That's a very important point that needs to be brought home that I'm not aware of. To the degree to which that could be done, that would really add value.

DR. BUCHANAN: Well, of course, it depends on the isotope and the organ. And I did do some calculations. I don't know if I did put it in that report. I know I sent them to John Stiver on some of the actinides and how much difference it would make, and it was, you know, significant enough that you wouldn't want to -- it wasn't like 1 millirem or 10 millirem. It was significant enough in the total dose that it would be effective, especially the

actinides. Now, the fission activation products, there's not as big of an impact usually from them. But, again, it depends on the organs. You have to look at the organ.

MR. STIVER: Ron, this is Stiver. I remember we did that I think as an exercise back before the November 2015 meeting. I think I still have that information around.

DR. BUCHANAN: Yes, I have that information somewhere, but it did show, I think I assumed lung, liver, and some other cancer and looked at if you got the wrong factor for some of the actinides and I believe fission activation products and what difference did it make, and it did make enough that you wouldn't want to ignore.

DR. TAULBEE: I would also add in some of these reports, Ron, where they don't necessarily indicate plutonium straight-out, especially in the 1960s, they do have a gross alpha measure that you could assume to be

plutonium or uranium and calculate out what that, you know, what that component is for those actinides in those early years and really bump up the number of your fission product-to-actinide ratios that you have available to analyze.

DR. BUCHANAN: Yes, it's true. I tried not to use any data that I didn't know for sure if they stated, you know, what specific isotope, so there wouldn't be any question on the ratio.

DR. TAULBEE: I understand that, but that would expand your current, one of your plots, plutonium-238 to strontium-90, you know, is kind of limited on the number of points from the 1975 time period and 1985 time period, and you could go back into the 1960s to look at that. And, also, if you break out the monthly values on that, as well, I think you'll also have some data that you can pull out of there. But I'll put that in an email to you.

DR. BUCHANAN: Yes. Can you send me

those references especially?

DR. TAULBEE: Yes, no problem.

DR. BUCHANAN: And I don't know if you can send me those plots that you just did here.

DR. TAULBEE: Oh, absolutely, absolutely.

DR. BUCHANAN: That would be useful.

DR. TAULBEE: That's not a problem.

CHAIRMAN SCHOFIELD: Anybody else got any questions?

MR. KATZ: Somebody's kitchen sounds are coming through the phone. Pots and pans. So are we ready for Steve?

CHAIRMAN SCHOFIELD: I think we're ready for Steve. Jim, do you have any comments?

MEMBER MELIUS: No, I don't.

MR. KATZ: Okay. So Steve -- and someone else, we can hear pots and pans and water in the background, so please mute your phone.

CHAIRMAN SCHOFIELD: You're making us hungry.

DR. OSTROW: Hi, this is Steve. I'm trying to put up something on the screen here in Live Meeting. Bear with me a second.

MR. KATZ: Thanks.

DR. OSTROW: Okay. Can everybody see this, my INL report?

MR. KATZ: Yes, yes, it's up, Steve.

INL SEC-00219 Reactor Priortization for Evaluation of ORAUT-OTIB-0054 Applicability

DR. OSTROW: Fantastic. Alright. A little background first. I'm going to be discussing my INL and the ANL-West reports that I did on prioritizing reactors to look at the details in comparison to OTIB-54. I'm going to combine them since it's basically the same process for different tests of reactors.

So a little bit of background first. As part of our review of the two SECs, the Board asked us to investigate the issue of dose reconstructability. Inherent in the SEC

framework is the dose needs to be reconstructed with sufficient accuracy to areas and time periods that lie outside the SEC Class definitions. And as we've been discussing for the last half-hour with Ron's presentation, one of the main tools that NIOSH uses for dose reconstruction is OTIB-54.

Now, we did two reports on it, one for INL and one for ANL-West. And what you see on the screen is the first one we did for INL. You might notice this is revision one. We had done rev zero, and we had some comments we should get some other criteria when we're doing the prioritization. So we revised our earlier report and came out with a new. We divided things in high, medium, and low categories for characterization.

One of the reasons that we're looking into this is that, as we'll see a little bit later, the OTIB assumed four different reactors that were supposed to be representative of the whole universe of

reactors, and they ran nine cases, four reactors and nine cases total. But as everyone knows, the operations at the INL and ANL-West reactors were very much different than a lot of the other reactors because it was the INL site with the testing stations to test different concepts. So there were things like fuel type, different types of fuel type, like fissile materials, chemical forms, cladding, and physical arrangements, and we looked at blankets. Some of them didn't have a blanket, some had reflectors, and some had breeding blankets, like U-238, to breed more fuel. Moderators ran the whole gamut, light water, heavy water, organic coolants. We had coolants, light water, heavy water, liquid metal, gas, organic.

Operating scenarios. Some were steady-state reactors, some were intermittent in that they ran in batches that they'd run full power for a certain amount of time and then they'd be taken down and then run again.

A few of the reactors were pulsed where they have a steady state, fairly low power, but they could be pulsed to huge power with very short periods of time, and they shut themselves down automatically.

Some of the reactors and experiments were run inside design limits, and some were deliberately or inadvertently taken outside of design limits. In a few cases, as you know, the fuel was melted on purpose. In a few cases, the fuel was melted inadvertently.

And, finally, with operating burnups, most of the reactors had fairly low burnups, as compared to the OTIB cases. And the consequence with low burnups, the long-lived decay products didn't have the opportunity to build up in the fuel, which might have resulted in different isotopic ratios than in the OTIB characteristic reactor cases.

So that's a little bit of background. So we decided to take a look at

all the reactors and prioritize looking at them.

Okay. Let me go down the report here. Bear with me a second here. Okay. So briefly on the OTIB-54, we've been hearing a lot about that. It's probably one of the most complex OTIBs that are out there. We had reviewed this in the Procedures Work Group in a lot of detail over a lot of months, and I think John Mauro mentioned earlier that SC&A is generally satisfied that the OTIB is worked as claimant-favorable for situations where it applies, but it probably doesn't apply to every situation. So this just shows the four stable, the four representative reactors in the OTIB, the Advanced Test Reactor which is an INL reactor, high-flux reactors, fast-flux test facility, the sodium-cooled fast reactors, and plutonium production reactors, and, finally, a trigger reactor which represents old research reactors.

Just in short, NIOSH ran ORIGEN

code. We talked about that. The isotopic build-up and depletion code and came out with nine cases listed here, three for the ATR, two for the Fast Flux Test Facility, two for the Hanford reactor, and two trigger reactors with different power levels and burnups. And the thought is, if you're looking at a particular reactor on any of the weapons facilities complexes, not just INL, you try to characterize the reactor and then pick whichever one of these was closest, seemed to be closest, and to use that as a basis. I think NIOSH had clarified at one point that they actually, in practice, run all nine cases and did the worst case if they can't determine exactly which is the best fit because that's claimant-favorable.

In all, there are 52 reactors on the entire site, and this agrees with the same list that NIOSH is using. All of it comes out of this book Stacy wrote in 2000. It's like a history of the layout of INL. So 52 reactors.

There's ANL-West reactors, there's the reactors that are in the INL area, there's a few that are in the Naval Research facility reactor area, so 52.

We took a look at it first, all 52. And for the INL consideration, we eliminated the 12 ANL-West reactors. That was a separate paper we looked at it. The four NRF reactors are not in the program. We had already evaluated, SC&A, six of the reactors in earlier studies. One I did was the test reactor area. It had three reactors. And John Mauro looked at the three header HTRE reactors in another report, so we didn't look at those again. Two of the 52 reactors never operated.

So for the first report, we were left with 24 candidate reactors. We excluded 24, so we were left with 28 candidate reactors to look at, and we prioritized high, medium, and low. And that was a little bit subjective, but we had some criteria that we looked at.

Well, first, this is our

categorization. We ended up with seven in the high category, six in the medium, and fifteen in the low category of the 28. Of the high category, the reactors we were left with was the LOFT, Loss-of-Fluid Test reactor; OMRE, which is the organic reactor; and then the four power burst reactors; and then the four SPERT reactors. That was the high category.

What criteria did we look at when we were doing this characterization? We looked at things that might affect the estimate of internal doses. We looked at the type of fuel, the enrichment, cladding, moderator coolant, operating mode, and the overall burnup as best as we could. It's sort of difficult to find this information.

As we revised the reports -- subsequent to revising reports on rev zero, a few other things like duration the reactor was in operating, the frequency of operation, incident, a few of the reactors were deliberately melted and a few inadvertently

melted; and the approximate number of workers potentially exposed. I think as John Mauro alluded a little bit earlier, it's one thing to be academic, but also you've got to consider does it really make a difference as far as exposures go?

Unfortunately, we weren't able to, at least in the screening study, to really estimate the number of workers potentially exposed to any of these reactors. That would have to be a follow-on study.

So this is what we finally ended up with, and our recommendation was to look at these reactors for the INL cases to start off. And just attached to this report I'm not going to go into now, we had, for each of the reactors under high priority leading to low priority, we had summary description of each of the reactors and some comments about how we reached our conclusions.

After we did this report, which was in June, we did also one very similar for ANL,

which is this one, which came out in July, July 13th. And the front part is all the same, the same considerations. We just looked at different reactors. And the results are down here. We finally came up with seven of the ANL-West reactors in the high priority. Let's see. Which reactors are they? It's the BORAX-VI, VII, VIII, and IX, oh, and X, the BORAX-I, II, III, IV, V, and 17 and 18 are EBR-1 and EBR-II.

So that was our recommendation we looked at, and we had the same thing at the end here where we discussed each reactor individually. Then just recently, I think it was on Friday, NIOSH responded to this. Okay. I guess the Work Group have seen this posted, and I hesitate to go through it since it's actually a work product of NIOSH, not us. But Tim Taulbee and company, on Friday, responded to our two White Papers with their proposal for the next steps forward.

We intended, SC&A, to take a closer

look at these reactors to get a more detailed characterization of the high priority we had looked at. NIOSH proposed, though, they discussed with -- Tim, is it okay if I show this you think?

DR. TAULBEE: Sure. If you want me to go through it, I'm willing to do that, but it's up to you.

DR. OSTROW: Let me just skip ahead, and then you can, you know, amplify. I don't want to speak for you guys, but let me just go ahead.

So they looked at our two reports, and the first couple of pages sort of summarized what we had done. And NIOSH had various reasons for changing some of the priorities that we had. They proposed --

MEMBER BEACH: So, Steve.

DR. OSTROW: Oh, here we go. Let me go down to the end here. Okay. On the conclusions proposal --

MEMBER BEACH: Steve?

DR. OSTROW: -- I'm not going to read the whole thing, but they decide, just for practical purposes, which I totally agree with, merging the INL and ANL-West high priority category reactors for evaluating OTIB-54. It doesn't make sense to do them as two separate exercises. It's the same, physically, bunch of reactors in the same place.

And for those reactors, NIOSH wants to run --

MEMBER BEACH: Hey, Steve, can I stop you for just a sec?

DR. OSTROW: Sure.

MEMBER BEACH: Wouldn't it be better if we just let NIOSH go over their paper, and then we can discuss the different aspects of both of them and decide where to go? It just seems odd that you're addressing their paper.

DR. OSTROW: No, I'm not really -- okay. That's fine with me, Tim, if you want to. I don't want to put you on the spot since I know you weren't planning to present this.

DR. TAULBEE: No, actually, I was, so that's fine.

DR. OSTROW: Oh, you were? Okay.

DR. TAULBEE: Yes, I was.

DR. OSTROW: Do you want to control this, or should I continue controlling it?

DR. TAULBEE: Right now, it's jumping all over on us, but that's fine. Actually, if you'll control it, that will save us a little bit of time of trying to bring one up.

If you could jump down to -- let's see. Scroll down, please, to maybe about page three. Oh, I'm sorry, it would be page -- on page three. Let me just start with our discussion of the reactors.

So to kind of summarize, we've got 14 high-priority reactors. At NIOSH, we just looked at the high priority because to give you a scale of what this is going to take to evaluate is we have to go back to the site, we have to get more information about the

reactors, their operating times, their power levels over time, to plug into ORIGEN to run these codes, so it's not trivial to do one of these reactors. This is a significant effort.

But we do feel that some of these reactors do need a look at. If you recall back a while ago, this issue of OTIB-54 applicability came up at Savannah River and we went back and we looked at other, we looked at heavy water reactors specifically and we found some surprises with regards to iodine. And so it has its own OTIB-54 now.

So we do feel that some of these reactors need to be followed up a little closer. So we looked at the high-priority reactors. Fourteen. That's a lot of reactors to try and go back and do this for, and so this is why we wanted to try and take the priority and condense them down to something manageable, something that we could put into a report.

And so let me go through the discussion here. And I'm just kind of going

through, and you'll see a mixture of both INL and ANL-West reactors.

The first one is Loss-of-Fluid Test facility. This one we're proposing to exclude at this time, and the reason is is that it's operating time period is outside of the current SEC. The SEC ends in December of 1974, and we have, this particular reactor didn't start nuclear operations until December of '78. We're not saying that this shouldn't be discussed or shouldn't be evaluated at some point. I do think that it should just be outside of this particular SEC component of evaluation, and so that's why we're asking that that one be pushed to the side at this time for what we're proposing.

The next reactor is OMRE. We agree with SC&A on this one that we should look at this one. This is an organic reactor. It has very different operating characteristics. And going through some of Ron's data of the different mixtures of radioisotopes and the

cesium and strontium, we're seeing some radionuclides that we haven't seen as a potential issue. And so we definitely feel that Organic Moderated Reactor needs to be looked at, and so we are proposing that that is one of the first ones we look at.

The Power Burst Facility is also the same thing. We agree that this is a unique fuel type and a unique facility where you've got power spikes going on, and we feel that this one should be evaluated, as well.

Next gets into the SPERT, the Special Power Excursion Test, and here's where you've got four reactors, one, two, three, and four. These were all very similar, similar type of operations. They do have different power ranges that they did at different bursts, but what we were proposing to do here is to combine them into one, to look at one particular, kind of our worst-case scenario, if you will, from a fuel standpoint, or most unusual. And we'll evaluate that one and then

apply it to the other SPERT reactors and see where we fall with OTIB-54. If this one is, you know, for example, way outside --

MEMBER BEACH: That would five of them. There's five SPERTs?

DR. TAULBEE: Four, four SPERTs, but we're going to combine them into one is what we're proposing. Now, if SPERT is the one outlier that we find in this whole thing, then maybe we want to expand it out into all four. But right now, we'd like to try and look at SPERTs combined but look at a particular kind of worst-case fuel, if you will, for them.

This gets us next to the boiling water reactors. BORAX-I, II, and III. There's an SEC already for BORAX-I, II, and III. This was one of our problems that we had early on. We don't have internal bioassay for these people. We know they went, and we know they picked up core pieces. This is part of our designation for making the early time of Argonne-West an SEC. So I don't see what's to

be gained here by going through and trying to model these particular reactors. We've already said we can't do dose reconstruction. We're going to use whatever bioassay is available, which is incredibly limited for these workers. And we will apply it to OTIB-54 in general, from a boiling water reactor standpoint; but there's really not much that we can do for this time period. We know people are exposed there. We know we don't have bioassay data to apply. So those I would like to propose that we don't evaluate.

BORAX-IV and V. Actually, BORAX-IV is one that is unusual. It has a uranium-thorium oxide fuel for a particular time period, and so this is something that hasn't been evaluated, it's not in OTIB-54. It's a different mix, and we do feel that that one should be evaluated.

BORAX-V, on the other hand, is really just a standard reactor. The difference between IV and V was they went back to a

regular type of fuel and added super heat systems to it. So it's not really a nuclear change, and we feel that the type of reactor style would cover the BORAX-V scenario.

Which gets us to EBR-1. There's four different core configurations associated with this. And for this, we are proposing -- let me see -- that we just use the most bounding of the last two EBR-I cores. The first two cores are 1951 through 1955. Again, this is under the SEC time period where we don't have internal dosimetry or internal bioassay, or external for that matter, for that reactor. Starting in '57, though, we do. We do start seeing bioassay to where we could apply OTIB-54 to it.

So for the Mark III and Mark IV, we'll pick whichever one has the configuration that would be most bounding. And this is going to involve taking some initial runs. This isn't something that's straightforward that you can just look at and say, oh, Mark IV is worse

than Mark III. We're going to have to do some preliminary modeling to see which one seems to be the more problematic of the two.

Finally, this gets us to EBR-II. And this is one where we agree that we should be looking at. Initially, we thought that this would be covered under the Fast Flux Test Facility because they're both sodium reactors. But the difference is FFTF, correct me if I'm wrong, was a plutonium core that was modeled, whereas EBR-1 only had uranium core. So we need to look at that one from a sodium moderation and blanket standpoint.

So from this particular kind of summary, if you will, we're proposing to go from 14 reactors down to six analyses with having the Organic Moderated Reactor; power burst facility; combine all of the SPERTs; evaluate BORAX-IV; the EBR-1 core, either core three or four, most likely core four; and then EBR-II. So that's our proposal to the Work Group as a starting point to see where we're at

after we get those six done and how they hold up against OTIB-54.

CHAIRMAN SCHOFIELD: I've got a quick question for you. Wasn't Brookhaven's an organic reactor, too? Brookhaven?

DR. TAULBEE: I don't believe so. OMRE was an organic reactor at Piqua --

CHAIRMAN SCHOFIELD: Okay. That's the one I'm trying to think of. Okay.

DR. TAULBEE: Yes. Piqua actually put into operation and used for a number of years.

CHAIRMAN SCHOFIELD: Okay. I was trying to remember --

DR. TAULBEE: It's the predecessor to Piqua.

CHAIRMAN SCHOFIELD: -- one we've dealt with before that's organic.

DR. TAULBEE: Yes, it's Piqua.

MEMBER ROESSLER: I'd like to hear Steve's comment. I assume he agrees with your evaluation on this.

MR. KATZ: No idea, but Steve? Steve, do you have a take on --

DR. OSTROW: Okay. I haven't had a chance to go into much detail. I agree with it in general. I think it's a good approach to do detailed ORIGEN runs of, you know, this set. I haven't had a chance to really look into NIOSH's, you know, reducing the number of reactors.

There's a few that were sort of obvious where the reactor operation was outside the time period we're looking at. That's like a no-brainer. But, for example, I haven't had a chance to really look at the SPERT reactors where they're just going to, you know, say all four or five, I forget which, are similar but to go look at the worst case. So I expect that we'll shortly make a comment on that, but the overall plan I think is a good one.

DR. MAURO: This is John. I have a perspective that I'd like to introduce because I keep my eye on the dose always. While the

nuclear engineers, the nuclear physicists are looking at the differences there are in these reactors and places where they are very different, of course that's important. But I'm thinking more along the lines of OTIB-54, and I say, okay, where do I get myself tripped up? In other words, where will I fool myself? And the way you fool yourself, it may not exist, but I don't know, and that is you take a urine sample, you do a gross beta or you do a gross gamma analysis, and embedded in that analysis is this assumption that most of those betas are strontium and most of those gammas are cesium. And once you've sort of hooked on to those -- of course there are others. That's what your mix is. And then you also have some alpha emitters.

And, in general, OTIB-54 works because you're working with reactors where the amount of cesium and strontium inventory into the core is relatively high because they have a long burnup. And then you're using -- and

that's the fuel. And then you're using partition factors, which really bring airborne a lot of radionuclides at a higher level than they probably expected. For example, the transuranics, et cetera, you're going to put them airborne at a ratio that's comparable to cesium, which is the secret to OTIB-54. That is putting more of that into the air, which gives them a lot of, gives them more weight than they probably deserve which tends to overstate what might be inhaled by the worker.

Now, the real question, the place where you would get tripped up, and so when you're asking yourself questions about what reactor I should use, I end up with a situation where I have very low levels of beta-gamma emitters relative to alpha emitters. It sounds like a strange circumstance, but that's the thing that's going to break it down. That is because what happens then is if that's the mix that's in the air and then you go look at what's in urine, that's what's going to turn it

such that you're going to grossly underestimate the dose. When that mix -- so it's not so much, it's when you have a reactor, and I can't tell by looking at this, when you have a reactor whose fuel, after whatever the cool-down time is, creates a circumstance where you don't really have a lot of beta and gamma in the air or in the fuel, but, for some reason, you're going to have a lot of alphas, and that's when I think, and I'm thinking this through as I'm speaking to you, that's where you could be tricked into thinking OTIB-54 is claimant-favorable when it's not.

And I wanted to bring that up because that's the test we're about to go through. So I was very happy to hear that you're actually going to run ORIGEN for these unusual reactors and conditions, but I would ask, and this would be very helpful to all concerned I believe, because OTIB-54 is an enigma to a certain degree and the only reason I got close to it is I actually did a dose

reconstruction by hand to say what is this thing, how does it really work, and I was able to match your numbers. So, I mean, I almost fell out of my chair because I figured it out. And it's complicated, and it's nuanced. The degree to which -- this is a request really -- when you finish making your ORIGEN runs, it would be very helpful to show the steps that's taken and must hold the reader's hand, how do I go from the mix of radionuclides that I have in the fuel after you run your ORIGEN run and let the cool down or whatever you're using, how do I get from there and use that information to get into a dose using a gross beta analysis for some worker? And maybe just do one case and walk the reader holding their hand through the process. And I found that, as I did that, and it wasn't easy to do, the lights started to go on because, right now, I'll tell you I guarantee you most folks who are not intimately involved in OTIB-54's construct, these are very elusive and why these ratios work and why OTIB-

54 could work and why OTIB-54 should be claimant-favorable under most circumstances. And what we're really doing right now is to see can we find circumstances where we're fooled and OTIB-54 is not necessarily claimant-favorable?

So I'm making this request which I think will raise the sea level in terms of everyone getting a much more comfortable sense of what OTIB-54 is, how it works, and why it works well. So I'd like to make that request to NIOSH when you're going through this process.

MEMBER BEACH: Okay.

DR. TAULBEE: If I understand your request correct, John, and correct me if I'm wrong because I'm trying to go from my memory here, is that you're wanting us to, as part of this once we get done, to walk the reader through OTIB-54, how you use it in dose reconstruction; is that correct?

DR. MAURO: Yes. And in a way --

DR. TAULBEE: So the people can see the different parts.

DR. MAURO: Yes, because when you read OTIB-54 now, it is a challenge. And to actually do an example and walk through it by hand, you see the wisdom embedded in it. And when you're doing your cases now, the a degree to which you could bring the results of your analysis to a real case and show why, even for this unusual fuel and circumstance, that it works well there. In other words, by using OTIB-54 even for that fuel, you're going to get a claimant-favorable result. It's not always immediately apparent, you know, by just looking at the fact that you picked these unusual fuels, that, in fact, the outcome is going to be a mix that will result in something that is either claimant-favorable or claimant-unfavorable. It's just not intuitively obvious.

DR. TAULBEE: Okay.

MR. KATZ: So, John, so you would

want an example for each of the reactors that end up in the final comparison analysis?

DR. MAURO: I mean, if that's possible, that would be great. But if not, you know, pick a couple that, based on certain judgment, seem to be good ones to walk through because those are the ones that could create circumstances that I just described that could really fool you. And by fooling you, I mean, holy mackerel, we've got a lot more transuranics here relative to beta-gamma than we would expect to get if we were to use OTIB-54. See, that would be the ones that you would want to find out. That's where OTIB-54 will fail if such a circumstance can even exist. I'm not even quite sure.

MR. STIVER: John, this is Stiver. You're trying to get at a situation where there was a reactor that probably was not run continuously to where you would have a buildup of strontium and cesium that you can use as markers? Is that the kind of what you're

looking at here?

DR. MAURO: But, but for some reason --

MR. STIVER: So I guess kind of inherent in the modeling parameters when you go about to do the ORIGEN runs, how long are you going to assume these burnups took place, how long was it going to be running, and so forth? So it seems like there might be an initial period of time where OTIB-54 might not be claimant-favorable for a lot of the reactors, you know, just given the amount of time it would take for those products to build up.

DR. MAURO: But bear in mind, on the other hand, if they're not there, if the cesium and the strontium aren't there yet, well, but you're assuming the beta-gamma that you do see in the urine are cesium and strontium, that, in itself, is claimant-favorable. What is the twist is, for some reason, you're getting a lot more alpha emitters than you had expected --

MR. KATZ: John, may I interrupt a

sec, both Johns? This is sort of getting to be inside baseball for most people, particularly the Work Group Members. And I think what would be useful -- Josie and Phillip, if you agree -- would be for -- SC&A, you didn't have a chance to respond formally. You know, you have sort of said orally, in general, you think what Tim has proposed makes sense, but if you have a chance to fully consider it and then respond so that we can move forward on this item. And we can move it forward in terms of what comes next for SC&A or NIOSH, however it is, without having another Work Group meeting, I think, if there's agreement there needs to be work that's done in this area.

MEMBER MELIUS: This is Jim. I want to interrupt this. I have some questions on that. I guess the one thing that sort of bothers me because I think we all know we've got sort of resource constraints, at least in terms of, you know, what can get done first, and it seems to me that what we seem to be

missing from this prioritization, at least I don't see it, as Steve Ostrow will mention, is really, you know, how many workers are involved in being exposed at these different reactors? It seems to me if we put a lot of our available technical resources into a reactor that maybe, you know, the health physicists may get excited about doing the work, it may be interesting, but it really doesn't move us very far along in terms of dealing with, you know, the people at the site and getting the dose reconstructions done. The only information we sort of have is, I think it was at least in, it was probably in the SC&A writeup and I saw it in Tim's is, you know, the years of operation. But, again, a lot of that was intermittent and so forth.

So I'm, like, trying to understand that part of it in terms of, you know, should that play a part in prioritizing what gets done immediately.

DR. TAULBEE: I can make a suggestion there, Dr. Melius, and that is the

reactor years are one component, but the monthly dosimetry reports that we use back for the CPP to determine how many badges were issued, those are all available for each of these areas, for OMRE, for Power Burst, for SPERT, for EBR-I and II. So those numbers could be easily looked at to see how many workers are monitored in those facilities.

MEMBER MELIUS: Yes, could we get that relatively quickly and put that together or at least for the, you know, potential high priority --

MEMBER BEACH: So I guess that brings us to, like, who's going to do what at this point. I know Steve --

MEMBER MELIUS: Yes, that was my second question. I'm a little confused that SC&A was proposing, seemed to be proposing work for you to do, Tim. I'm not opposed to, you know, a joint effort and so forth, but it just --

MEMBER BEACH: Well, I'm wondering,

Jim, on that if SC&A can give a response based on Tim's report, which would be the logical next step, and, in determining that, if Steve would be able to look at the numbers of people that were in those areas because I know we asked that early on of those reactors. Is that something --

MR. STIVER: Steve, I thought that we had looked at those initial characteristics.

MR. KATZ: There's only one reactor where you actually gave any real information about that, though. Steve, I mean, you can fill it in but --

MR. STIVER: Yes, in revision one, we looked at all those other characteristics. The potential --

DR. OSTROW: We looked at mainly physics characterization and got our list of many reactors down to just a few. The next logical step, as everyone has been talking about here, is to look and see whether anybody, you know, how many people were actually exposed

to it. That's like another level of looking into this.

MR. STIVER: Yes, I thought we already did that, though.

MR. KATZ: Well, we asked for it, but I don't think --

MR. STIVER: I thought it was kind of inherent in rev one. That's why we produced rev one was to look at that --

DR. OSTROW: Yes, we did that more qualitatively than quantitatively. We looked at the years of operation.

MR. STIVER: Oh, okay. So kind of indirectly.

DR. OSTROW: Yes, we didn't go in-depth.

MEMBER MELIUS: Yes, at least we could do that for the high-priority list.

DR. OSTROW: Okay, sure. We could do that, combine it, respond to NIOSH's proposal that Tim put out on last Friday, and also, you know, put in as much as we can the

potential for exposure that people would have to these reactors.

MEMBER MELIUS: Okay. Yes, I mean -- yes. Then I think it would be helpful to have another Work Group meeting, if only a brief call, so we all understand where we're going forward with this.

MR. KATZ: So, Steve, so you'll include what Tim suggested, dosimeter counts, so you actually get real numbers?

DR. OSTROW: Yes.

MR. KATZ: Okay.

CHAIRMAN SCHOFIELD: So what kind of agreement are we going to have here between the priorities, Steve, that you want on the reactors and NIOSH, what their priority is.

MR. KATZ: Well, he's going to look at that.

MEMBER BEACH: And I don't know if you caught this, Steve, but Bob said that would be real easy to do, so you might enlist his help.

DR. OSTROW: Okay.

MEMBER BEACH: Bob is looking for work.

DR. OSTROW: Okay. Bob said real easy. Okay. We put that down.

(Simultaneous speaking)

DR. OSTROW: So, Tim, does that make sense to you? DR. TAULBEE: Absolutely, absolutely. Yes, this makes perfect sense to me because you will see some big differences in the number of workers across some of these facilities.

DR. OSTROW: Yes, just in terms of workers because I think we need to seriously pare this down, but I can be convinced otherwise, maybe even from Tim. So at least we need to stage it, but maybe there's efficiencies in doing, you know, several at once or whatever.

MR. KATZ: Okay. So, SC&A, once you get a handle on how much time you need, let me know and we'll schedule a call.

DR. OSTROW: Okay.

MEMBER BEACH: So then once SC&A responds and the Work Group agrees, then it's back to NIOSH. You'll take the ball to do the reports, right?

DR. TAULBEE: Yes, that is correct.

MEMBER BEACH: So just stepping on Phil here, is everybody in agreement? Are we finished with this, the reactors? I was going to propose a break and then try to regroup on what we have left in what time we have left.

MR. KATZ: Yes, a comfort break? That makes sense. So how about just try to keep it brief. Ten minutes or less. At 2:30, and we'll reconvene.

(Whereupon, the above-entitled matter went off the record at 2:22 p.m. and resumed at 2:30 p.m.)

MEMBER BEACH: Alright. So we've had a couple of different requests, so we need to prioritize. We have several agenda items that we're not going to get through. NIOSH

would like a list of what our priorities are as a Work Group, so Jim and Gen and Phil and I have, do we have some ideas of what our priorities are for NIOSH?

CHAIRMAN SCHOFIELD: Well, the one I've got right off the top of my head is actually kind of a combination. I'd like SC&A and NIOSH to look at the reactors and make a determination which ones they want, they feel have the highest priority to be looked at, as far as personnel and types of exposures.

(Simultaneous speaking)

CHAIRMAN SCHOFIELD: We discussed this earlier, but I think that's kind of, yes, give it a higher priority, and then we can know where we can go from there.

NIOSH Update on ER Addendum and Provide a Tentative Schedule

DR. TAULBEE: Alright. Just to give a little bit of an idea of where we are, because this was one of the agenda items that I don't think we're going to be getting to, is we

are working on the ER addendum currently. We've got those parts that we need to finish up, and our current target is to try and get that done November in order for the Board meeting the first couple of days in December. So that's where we are currently targeting. That's kind of our top priority that we've got on our plate.

MEMBER BEACH: And it should be.

DR. TAULBEE: Okay. I just want to make sure you all are aware of that. Okay. The next item that I wanted to bring up, and this is where it gets gray for me, is to what is the next priority of do we tackle some of these White Papers and issues that SC&A has raised, or do we move, do you want us to move forward on an 83.14 for the CPP Class post-1974? That's where it's a gray area. We know we've got a potential deficiency there that we'd like to go and address, but we've got a lot of, you know, these other issues that have come in now from the side, and so looking for

some direction from you all as to which you want us to pursue. I'm not saying we can't do them both at the same time, but one is going to be, they're going to be both slowing down a bit and I want to know which one you want us to focus on more of.

MEMBER BEACH: There are several topics on here that are Site Profile in nature. I think those should all go to the bottom of the list personally.

DR. TAULBEE: Okay. Which ones are they that you're considering Site Profile in nature?

MEMBER BEACH: Well, integrated status reports of Site Profile and SEC -- well, I don't know because that does have some SEC --

MR. STIVER: Well, that's really just sort of a crosswalk of the --

MEMBER BEACH: A crosswalk, yes.

MR. STIVER: -- Site Profile and the SEC issues, what commonalities there are between, so that's not really an actionable

type --

MEMBER BEACH: No, it's not.

MR. STIVER: -- thing.

CHAIRMAN SCHOFIELD: My feeling is on the Special Exposure Cohort, until we get this, we really can't go much until like the first responders until we have kind of, where we know where we're going with that issue.

DR. TAULBEE: Well, that one we're actually going to be pursuing in conjunction with the ER addendum with trying to do the interviews, especially the first week of November type of time frame. So those are kind of going in parallel along that one.

CHAIRMAN SCHOFIELD: Oh, okay. That --

DR. TAULBEE: But that does limit, I mean, for us to be able to respond to some of these other issues, like Hans' issue with the general area air sampling that came up. Ron Buchanan and I will send him the information that we have, you know, that we've come

together on that, but a more formal response, if I'm understanding you correct, you want to hold off on our response to Ron's until after he gets this other data and he writes a response, right?

MEMBER BEACH: Yes.

DR. TAULBEE: Alright. So that one we'll put on hold until we see a revision then from Ron, so that's fine.

CHAIRMAN SCHOFIELD: Yes, so I don't see us voting on an SEC at the full Board meeting in a few days. I mean, I think it's got to be put off for a while.

DR. TAULBEE: Okay. That leads to the general area air sampling one which where does that fall?

MEMBER BEACH: I would say it falls under the ER addendum, the 83.14, the interviews. That's just me. I don't know how much you can do at the same time, though.

MEMBER MELIUS: This is Jim. I think that has a potential to be an SEC issue.

I mean, these are hard to judge. I don't want to sort of jump to conclusions on it, but, you know, it could go either way. And I think the interviews and more information on, you know, the areas we're talking about will be important there. So sorting that out I think is important. Where it ends up, it's hard to say.

MEMBER BEACH: Okay. So you're wanting to add that one to the list of important --

MEMBER MELIUS: To me, that's a priority because it's potentially an SEC.

MEMBER BEACH: Okay. So the one that you already agreed to the action, for the very first topic, the general air sampling and internal --

MEMBER MELIUS: Yes, there's follow-up, but that follow-up could play as a priority. That's all.

MEMBER BEACH: Okay.

MR. STIVER: Could you say that again, Josie?

MEMBER BEACH: So the very first topic that NIOSH agreed to prepare a response was the review of Petition Evaluation Report for SEC-224 Argonne National Lab-West regarding the use of air sampling for internal dose assessment, the one that Hans reported on.

MR. STIVER: Hans' general area.

MEMBER BEACH: Yes.

MR. STIVER: Okay.

MEMBER BEACH: It's really hard to say on some of these since we haven't really talked about them, but some of the issues --

DR. TAULBEE: Okay. Then I guess, from my understanding of kind of our top then, it's the ER addendum, which we're doing in conjunction with the first responders.

MEMBER BEACH: Yes.

DR. TAULBEE: Once that's done, then we'll do this general area paper response; is that correct? Is that what you're requesting?

MEMBER MELIUS: Yes.

DR. TAULBEE: Okay.

MEMBER BEACH: And that falls ahead of the 83.14?

DR. TAULBEE: That's my understanding.

CHAIRMAN SCHOFIELD: I don't think we can do the 83.14 until those questions are kind of answered and fleshed out.

DR. TAULBEE: Well, they're actually two separate areas. One is Argonne-West and the other is INL for CPP.

CHAIRMAN SCHOFIELD: Right. But, I mean, those are issues that we've got to --

MR. KATZ: But those aren't in the way of the 83.14.

MR. STIVER: I thought they were combined, but they're separate issues.

MEMBER BEACH: And then the reactors. Once you get SC&A's report on the reactors, then that would require a phone call, or would you be able to just go to work on those? Ted, what do you think?

DR. TAULBEE: Well, we wouldn't, we

actually wouldn't go to work immediately on those. My guess is is that SC&A will probably respond in the next month or so. We'll have a Work Group call in September or maybe early October. We'll get it finalized, and so it would be later this fall before we can tag people free to start going to get that reactor data that is necessary.

So that one right now, from our standpoint, isn't a big drain on our resources. It's more you guys responding, and then us participating in a call. So we should be able to do that, from that standpoint.

So that can all be done, I think, as we're working on the ER addendum. And then once that gets done, we will jump first then on the general area air sampling paper and the reactor prioritization will follow that. Does that sound reasonable, Dr. Melius?

MEMBER MELIUS: Yes. Again, I'd like to see what you come back with on the reactors, you know, later this fall and then

decide should there be other priorities that are ahead of that.

DR. TAULBEE: Okay. Makes sense.

MEMBER MELIUS: Yes. I mean, how we handle -- again, it could be a big resource draw, and I think, once you get started on some of it, you want to be able to continue and follow-up.

MEMBER BEACH: What about the evaluation of monitoring practices for claimants? Is that something that needs to be on the priority list?

MR. BARTON: We didn't really talk about it today.

MEMBER BEACH: No, I know. That's why I'm asking.

MR. BARTON: Part of it might be an issue similar to INL where you might have a coding issue based on some of the findings we had, but also, if you read the report, there appears to somewhat of a gap that may sort of require, I think, a coworker evaluation looking

to see why we're suddenly seeing what appears to be a gap in the mid-70s for at least this random sample. I don't know where that falls as far as the priority. It might be just a simple -- because we were talking about the fission product bioassay, so, even though there appears to be a gap, there might be enough there just to go in and make a coworker model, or if we look at the operations there and say, you know, that's what's happening and we don't have a bioassay to cover it, that would then become an SEC issue. But I don't have any indication that that is, in fact, what happened. It might just be a policy decision at the time that wouldn't come back on our bioassay program because maybe they were seeing a lot of non-detects or something like that. I really don't know.

DR. TAULBEE: This is just a perfect opening for me to mention again where we are with the data coding on the in vitro analysis because ANL-West is part of that. Once we get

that data coded, it will be very easy to see whether we've got a monitoring gap there or not. And the site might actually have a gap where they're not reporting some data. There could be a set of records that didn't get tagged properly from what you showed there, Bob, or it could be that they pared back. Once we get this data coded from the site, it will be clearly evident as to whether, you know, which way it goes from that standpoint. So I would think that holding off on that until we get that data coded, which will be after the first of the year, it would be very beneficial, at least from my standpoint. There could be an issue; I don't know. But we won't know until we get the data coded.

MEMBER BEACH: Sure, sure.

MR. BARTON: And that would just go in tandem with the other --

MEMBER BEACH: Okay. So does that seem like enough right there to --

DR. TAULBEE: It does. It gives me

the direction of where we need to go, so thank you. It helps.

MEMBER BEACH: And the other thing I want to bring up, I know Kathy did a report on all the OTIBs associated with INL and the one that stood out to me and SC&A recommended, and I know -- Kathy, are you on the phone -- recommended --

MS. K. BEHLING: Yes, I am, Josie. I'm here.

MEMBER BEACH: -- recommended reviewing, SC&A reviewing is the OTIB-54. So I guess my question to the Work Group in general is is that something that we should task to SC&A to start that process, or is it something we should wait on?

MR. KATZ: Is that an SEC matter? What is the --

MR. STIVER: These are just, Kathy went and prepared a list of the OTIBs that are relevant that were basically cited in the SEC Evaluation Report to see which ones had open

findings and so forth. This particular example is a revision that we have not looked at yet.

MEMBER BEACH: But it's one that's --

MR. STIVER: But it may be pertinent to --

MEMBER BEACH: -- pertinent because of --

MR. STIVER: I don't know if it's a SEC context or a Site Profile context.

MEMBER BEACH: I don't know either.

Status of OTIB's Identified in Section 4.2 of Argonne National Laboratory-West Special Cohort Evaluation Report

MS. K. BEHLING: Yes, this is Kathy. We had reviewed, obviously we reviewed OTIB-54. What had happened is there was a revision two that came out where NIOSH corrected some errors, and it was in two tables, specific tables. And so I had just recommended that we could possibly do a very highly focused review of those corrections just to ensure that they were, the intake fractions are correct and were

entered into those tables correctly.

MR. KATZ: Okay. But that then doesn't sound like an SEC matter at all. It sounds like, that sounds like a Site Profile-type level review.

DR. OSTROW: It's actually a Procedures Work Group --

MR. KATZ: Right. All I'm saying is it doesn't sound like it's somewhere where we may find an SEC issue. The fractions are correct or not, and, if it's not, then there's a course for correcting it.

MEMBER BEACH: Okay. Because of the reactors and OTIB-54, I wasn't sure if it was pertinent. So thank you.

MR. KATZ: Kathy, that sounds like a good one to put on the list to discuss at the Site Profile, I mean at the --

MS. K. BEHLING: Okay. That's fine.

MR. KATZ: -- the Procedures Review Subcommittee.

MS. K. BEHLING: Okay, very good.

DR. OSTROW: The latest revision of the OTIB is revision four. But I'm looking at a revision log now. It seems like revision two, three, and four are just created, excuse me, corrected minor errors in some of the tables, so they probably should be looked at, but it's probably not a big deal.

MR. KATZ: Thanks, Steve.

MEMBER BEACH: So are there any other items that we haven't discussed that we need to discuss with NIOSH on the agenda today? NIOSH, any questions or anything you want to go over with some of the reports that are out?

MR. KATZ: Yes. Particularly for NIOSH, if some of these items you need clarification from SC&A related to their papers.

MEMBER BEACH: We still have 45 minutes.

MR. KATZ: Yes. But I'd rather not be the last one to --

MEMBER BEACH: Yes, yes, yes. Forty

minutes.

MR. KATZ: I mean, I can run but.

MEMBER BEACH: Yes. So while you're doing that, we should also talk about what reports are going to, who's doing what reporting at the meeting.

MR. KATZ: Right. We do need a plan for the Board meeting. We have an hour and a half set aside, I think, for INL and ANL-West. At this point, it seems it's going to be updating the rest of the Board on where we are with everything. So you want to plan a part to deal with the SEC proposal, the Class proposal, and then part to deal with the work going forward.

Are you still considering, Tim?

DR. TAULBEE: Oh, I looked at the listing, and I think we're good.

MR. KATZ: Okay. So the White Papers you've received, you understand them.

DR. TAULBEE: Yes, yes, yes, we do. And the understanding that Ron is going to be

updating his and that we're going to be getting a response from SC&A on the reactor prioritization one. The general area one is the one that we need to respond to once we get our addendum done, and so I think we're good, at least for the next few months.

MR. KATZ: So, Josie, I guess if you and Phil want to let John know or discuss now what parts of the presentation you're comfortable preparing or whether you want them to draft all and what you want them to cover.

MEMBER BEACH: I guess Phil is going to be at the meeting so --

CHAIRMAN SCHOFIELD: Yes, I'd kind of like to see what SC&A feels that -- where they can go or what the assignments we've given you, the data stuff, they're looking at. Kind of a timeline.

MR. STIVER: Okay. I can do that.

MEMBER BEACH: Can I go back to NIOSH? Can you put that brief description on the top of your list, too, as a priority?

DR. TAULBEE: The brief description?

MEMBER BEACH: The two-page overview.

DR. TAULBEE: Oh, yes, yes, yes, yes.

MEMBER BEACH: Let's add that to the top because I know you already started working on it. Yes, once we've got these, we've had INL and ANL and then we combined them back together, so, I mean, it would be just nice to --

DR. TAULBEE: Yes.

MEMBER BEACH: I don't know if it will help.

MR. KATZ: We need an update for the rest of the Board on the Class to start with, right? Because that's sort of one item that might have been actionable that was clearly possible as an action. So we need a sort of update on that, and then let's say, I mean, again, you may have some folks there from INL that will want an update on where we are on,

well, SEC stuff being the priority, not TBD, yes.

MEMBER BEACH: Maybe just a real brief overview of how we're going to do the reactor status. I don't, I mean, that's one of the big things we discussed today.

MR. STIVER: Yes, I mean, we can certainly talk about, just brief for the rest of the Board.

MR. KATZ: Yes, and they don't need to process so much.

MR. STIVER: Exactly.

MR. KATZ: Right?

MEMBER BEACH: Right, no process at this point.

MR. STIVER: Okay.

MEMBER BEACH: Definitely I don't think we need an hour and a half, unless Tim wants to talk about maybe some stuff that's ongoing. Are you prepared to talk about the 83.14 or is that something that's totally not out there?

DR. TAULBEE: Totally not out there.

MR. STIVER: So were you planning on doing the --

DR. TAULBEE: No, because I wouldn't list it on the agenda, so I didn't --

DR. NETON: It's getting kind of late in the game for us to give presentations through a review process right now.

MR. KATZ: Well, the start time for that session is stuck because it's an SEC petition and we've put it out there, the agenda. So we have the time to do what we can, but, yes, you don't need to make up material --

MEMBER BEACH: No, no.

MR. KATZ: -- to fill the time.

MR. STIVER: I think we have enough to put down without making any --

MEMBER BEACH: Well, do you want to do a presentation? I've got all the slides from the last one, but I don't think we've really changed much since the last presentation. There's not a whole --

CHAIRMAN SCHOFIELD: I don't think so.

MEMBER ROESSLER: But I think --

MR. KATZ: Well, there's been quite a bit done on the Class.

MEMBER BEACH: Yes.

MEMBER ROESSLER: Since we'll have the Board there that need reminders, and there may be local people there, I think a five-minute, maybe, summary of the whole picture just to bring everybody up-to-date on --

CHAIRMAN SCHOFIELD: Yes, because people are going to wonder what's happening with the SEC. I mean, they're going to want to know.

MR. KATZ: Well, you have to SECs.

CHAIRMAN SCHOFIELD: Right. But, I mean, people are going to want to know, okay, is anything being done.

MR. STIVER: So you want me to do the actual presentation, or are you guys going to do that or --

CHAIRMAN SCHOFIELD: Yes.

MEMBER BEACH: So that's what I was asking Phil if he was going to do one and then you were obviously --

MR. STIVER: Okay. He can give the five-minute cameo, and then I can kind of --

MR. KATZ: Yes, whatever. If you prefer to just introduce John, that's fine.

MR. STIVER: I'm amenable to whatever you guys want to do.

MR. KATZ: Is that what you want, Phil?

CHAIRMAN SCHOFIELD: Yes, it sounds good to me. He's a better speaker than I am.

DR. TAULBEE: So just going to give an overview of kind of where you all are.

MR. STIVER: Yes, and then just kind of open it up for responses. You guys can tell me where I went wrong.

MR. KATZ: That works.

CHAIRMAN SCHOFIELD: Hopefully, we'll have some questions coming from the

public.

MR. KATZ: Or the other Board Members.

CHAIRMAN SCHOFIELD: Or other Board Members.

MR. KATZ: The petitioners will have an opportunity to speak, as well, comment, or both. I think it's the same petitioner.

CHAIRMAN SCHOFIELD: I think there's so much still out there on that site that's kind of overwhelming for a lot of people.

MR. STIVER: Many sites in one.

MR. KATZ: So then, now that that's settled, is there another, we have time if there's more to present that can be fit --

MR. BARTON: This was the ANL monitoring practices?

MEMBER BEACH: Yes.

MR. BARTON: Yes.

Integrated Status Report of Site Profile and SEC Issues Related to INL and ANL-W

DR. MAURO: This is John Mauro. I'm

online and was listening. It sounds like you're closing down. I just wanted to bring something up. Can everyone hear me?

MR. KATZ: Yes.

DR. MAURO: I just want to bring something up. There was one report that I worked on. It was called the "Integrated INL/ANL-West Matrix." To a certain extent, it almost is the big picture, and there's a report there that everyone has. I just wanted to draw everyone's attention. You don't need to do this now, but Table 4 in that report on page 41 is my effort to go back in time, from 2007 and go back and revisit the history of the entire program for INL through where we are, not quite to today but to a few weeks ago, and identify all of the active issues, all the issues that have been closed, all the issues that have been recommended to be closed by SC&A, but all of the issues that are still active. And those issues that are still active, which ones apply to INL in general, which ones apply to ANL-

West, and, of those, which would be considered, in SC&A's opinion, potential SEC issues?

So we spent most of today really in the weeds, you know, looking at very specific issues, very important issues. But at the same time, we've never really stepped back because this program has been going on since 2006 where we have had meetings on all of these matters that are dispersed in there with the SECs that jump in and sort of closed down some of the dialogue. So I'd just like to alert everyone on the phone that there is this integrated matrix report and there is this Table 4 that's in there that tries to capture the big picture. And it would probably be helpful to maybe, John, take a look at it, especially in light of today's conversation, make sure that all of the issues, I didn't miss anything and that they've been properly characterized as which have been closed, which ones are open, and which ones everyone sort of, more or less, agrees, yes, this is an SEC issue.

I see John is bringing it up on the board right now. That might be helpful in terms of getting the big picture, and then you work your way into the specific items and where we are in those items.

MR. STIVER: Hey, John, I think a lot of those in Table 4, those are the Site Profile issues that we kind of put in the kind of, you know, part of when we were sort of working through the SEC ERs. But you're right. I think there were some that were still never really run to ground and may have some SEC potential associated with them. So that --

DR. MAURO: Yes, that was the reason I put this together.

MR. STIVER: Yes, the table really does lay it all out there.

CHAIRMAN SCHOFIELD: I got one comment on that. If we put this table out to the public, people are going to ask, well, like issue number six, SC&A recommends closing, what was issue number six?

MR. STIVER: Yes, you need to have the original matrix as kind of a companion to that table.

CHAIRMAN SCHOFIELD: Yes. Otherwise, it doesn't --

MR. KATZ: I mean, that paper is, I don't know if that paper is one that's cleared yet. It doesn't really matter. But I think, John, I mean, you can just work that into your presentation. You don't need to get into the weeds about all these that are recommended for closure or whatever, but if there's some --

DR. MAURO: The answers to those questions you raise of what was closed and why, that's part of the main body of the -- that's why it's a large report.

CHAIRMAN SCHOFIELD: Right. But, I mean, I'm just thinking if we put the table out to the public --

MR. STIVER: It's going to raise more questions --

CHAIRMAN SCHOFIELD: -- it's going

to raise a lot of questions. And those that are kind of closed and are no longer open, I don't --

MR. KATZ: It's just more detail that --

CHAIRMAN SCHOFIELD: It's just more detailed, and they really don't --

MR. KATZ: Right.

DR. MAURO: I didn't mean this as something for the meeting. It's something that we didn't cover today, and I just wanted to let everyone know it is out there for your use as you see fit.

CHAIRMAN SCHOFIELD: Appreciate that.

MEMBER BEACH: Yes, good job on that, John. I think the big thing for SC&A is, if there are SEC issues, we need to make sure that we capture those and we're moving forward with those items.

MR. STIVER: We have it in the SEC issues --

MEMBER BEACH: Yes. Just so it's captured there.

MR. KATZ: Before we move to Bob, can I just check and see do we have either the petitioners for INL or ANL-West on the line yet? Okay. I just wanted to give them a chance if they were and they had any comments they planned to give today. Tim?

DR. TAULBEE: I do have a question on this Table 4 from John. There are some things there that are asterisked there. If I interpret this correctly, whenever there's a yes and an asterisk, those are things that SC&A considered to be SEC issues?

DR. MAURO: The answer to that is I wrote that report and I was the one who made that judgment, and it was intended to be used by the Work Group for discussion purposes only. So it's simply my perspective on what's still active and, of those, which ones do I feel have the potential to be SEC issues? So the answer is, yes, that's what those asterisks mean for

both INL and ANL-West. The degree to which, you know, the Work Group and the Board and NIOSH agree with that of course is a matter for discussion. But I put that in so that, to kick off the discussion.

DR. TAULBEE: Okay. Because that should be something that I think should be discussed here.

MR. KATZ: Oh, I mean, you can use this time, instead of Bob, if you want to discuss that now.

DR. TAULBEE: It's up to you all.

MR. KATZ: It's relevant to John's presentation at the Board meeting anyway.

CHAIRMAN SCHOFIELD: Why don't we give it to Bob and let him do his thing?

MR. KATZ: Well, Bob's is a separate issue.

CHAIRMAN SCHOFIELD: Right. I mean --

MR. KATZ: So John Mauro is just saying, raising issues, some of which may have

SEC --

DR. TAULBEE: I mean, because some of these we're not working on.

MR. KATZ: -- significance --

MR. STIVER: A couple of years ago, before the ER came out, we had prepared a series of papers. We never delivered them because, you know, once the SEC came along and put all that stuff on the table, and we never looked at it. Now, a lot of these things that John is talking about are related to those papers that weren't related to the worker to begin with.

MEMBER BEACH: Right.

MR. KATZ: Yes, understood. Right.

MEMBER BEACH: Which are in archives until we get to Site Profile. So my comment is somebody needs to decide if these are SEC issues and they need to be brought forward. So we can't just forget this report. It has some merit in that aspect.

MR. KATZ: Right. So do you want

Tim to respond to any of those now as part of this discussion?

MEMBER BEACH: If Tim is prepared to or, if not, you can put that on your list.

DR. TAULBEE: I have some questions regarding that.

MEMBER BEACH: Okay. Let's do that.

MR. KATZ: Okay. That's a good use of the time.

DR. TAULBEE: It looks like, if I go through the INL listing here, the ones that are applicable to INL where there's yes and yes and an asterisk, number 16 is the first one for the need for an external coworker model.

DR. MAURO: Yes.

DR. TAULBEE: And that is one where we had responded that we do not intend to do an external coworker model because people going into the reactor facilities were all badged. And so now, especially with these temporary badges that are now being coded and we will have that data with each claim, we still stand

by that. But if there's a reason that SC&A feels that this is an SEC issue, I would like to hear it and consider it.

MR. STIVER: Now, remember this came, we talked about this in a lot of detail back in November, and we had gone ahead and looked at this in relation to TAN and the quality of the dosimetry, whether there was enough there to make a coworker model. And we were kind of going on the presumption, because you guys could determine that you could do reconstruction, that that was the full data set. It turns out, you let us know it was just a sampling, but you still feel that there's probably enough there that you can do a dose reconstruction.

And we discussed this, I believe, and Dr. Melius said that, you know, going after and doing a big data capture and review at this time was probably not a high priority, and so it was basically tabled. So I think it's really not an SEC issue at this time. It would

be one of those situations where, if you did determine they needed to make a coworker model, would you be able to do it for all the different subcategories within TAN, and that's kind of where we left it.

DR. TAULBEE: Okay. So that's really more for kind of a TAN-specific --

MR. STIVER: Yes.

DR. TAULBEE: Okay, alright. So that's a --

MR. STIVER: John, correct me if I garbled that up for you.

DR. MAURO: Yes, you didn't, but let me just say a little bit more. At the time of the review, as you recall, there was certain areas held in reserve that might still become SEC issues. But one of them wasn't external dose. For my case, I looked at TAN, and, when I looked at TAN and we looked at the data that were available, it was clear that it was not, the data was such that many at the sub-facilities within TAN, you could not determine

where the worker worked. You had a very complete data set, but you didn't know where the worker worked. And there was some uncertainty was, in fact, everyone badged?

Now, we were at a place at that time where we did not have the evidence that everyone was badged. And, second, we were at a place where, if they were badged, is it apparent that if everyone was badged that's the end of the problem? But it wasn't apparent that was the case.

Now, what you know now is that, and I don't know if this is the case, if everyone was, in fact, badged, there's no need for a coworker model; and, therefore, there is no issue related to the need for a coworker model, and that asterisk goes away. Is that where we are now? That is, are you at a point where you've collected enough data, in this case it would be TAN because that was the one I was familiar with, where you could say with confidence that, you know, we have a complete

data set and we don't need a coworker model?

DR. TAULBEE: I guess I would ask you all that question. And the reason that I say that is because, since those discussions back in November, we have captured all of the area exposure reports for all areas from the site. We now have that in the SRDB there uploaded by area, and so you can go through all of the TAN data yourself if you want. That is now available in the SRDB.

DR. MAURO: I think a good way to get rid of that asterisk is for SC&A to do just what you said. I do not believe we've been authorized --

MR. STIVER: We were not authorized as of November, and I know Dr. Melius didn't want to turn this into a -- yes, it wasn't really a priority. Now, the fact that these reports are out there and easy to access, there may not be such a big effort involved.

DR. TAULBEE: And what we did, we didn't ask for just TAN. We asked for all

those dosimetry reports for the whole site, and it came on a terabyte drive.

MR. BARTON: Is that for Argonne, too, or just Idaho?

DR. TAULBEE: Argonne, too.

MEMBER BEACH: I honestly don't know if it's --

MR. STIVER: Yes, we may be kind of teed up for future review.

MR. BARTON: I know, as far as Argonne goes, two of the findings in the monitoring practices report were based on what were perceived deficiencies in two workers' files where they were monitored internally, but we had no external dose in those same periods. So, I mean, that could potentially be a deficiency at Argonne. I don't know that we came across something like that at INL. Nothing really comes to mind.

DR. TAULBEE: When I saw that in your report, I flagged it in my notes that we're going to be following up on that.

MR. BARTON: Beautiful.

DR. TAULBEE: Argonne-West, as well, from those dosimetry reports because I believe he's in there and, for some reason, the site didn't provide it. I have no idea why.

CHAIRMAN SCHOFIELD: So I've got a quick question on 19 on the angular dependence. We've run across that on film badges, you know, TLDs at numerous sites. It seems like to me we've had a lot of work done on that for an OTIB or something that might be applicable in this case.

DR. MAURO: I do not consider it to be a potential SEC issue, but I don't believe the issue has been completely closed. There is an OTIB that presents correction factors when a person is working -- I think it's OTIB-10 I'm guessing, where a person is working at a hot cell or a glove box and there is, you know, there's an angle of exposure where, you know, he may be wearing his film badge on his lapel, but the concern is maybe a cancer that's in the

lower part of the body. And that OTIB accounts for that. It does a very nice job.

What it does not do, and correct me if I'm wrong, I could not find any guidance where when the angle of incidence coming in is interacting with the cadmium shield on the front of the film badge that's sitting on your lapel, it's going to behave in a way that has been very well researched in the literature, but there's no accountability for how the badge is going to react to this angle of incidence. The only thing that's accounted for is the inverse square law in the OTIB but not the fact that you're going to be coming in at this angle striking the covered shield for, you know, the cadmium shield on the front of a film badge, and that could have a substantial effect on the reading.

As a matter of fact, Hans Behling wrote a very nice report on this. And I have to say, when I worked on this piece of this product here, I did the best I could to see if

there was anything out there. I went through the transcripts, and I went through the procedures, and I could not find a place where that particular aspect to angle of incidence has been addressed, so that's why I left it in as a yes.

Now, there's no asterisk on it because I think this is a tractable problem, very much so. But it has not yet been addressed, and it could result, if not taken into consideration, an underestimate of the doses to a worker.

MR. KATZ: So thanks, John. So, Tim, are there any other issues you want to touch on for clarification or what have you?

DR. TAULBEE: Yes, 31 and 34. Those are the other two that have asterisks here. And my question is is what is the SEC concern with regards to these?

MR. KATZ: Can you just -- 31 is what?

DR. TAULBEE: It's the neutron

dosimetry completeness issue.

MEMBER BEACH: And adequacy of neutron exposure models. Those are 31 and 34.

DR. MAURO: This is not unlike the last one we talked about. When we reviewed TAN and the Site Profile in general, the position was that neutron exposures can be reconstructed. But in our review, and we did a careful review of the records at the time, and what we found was that it appeared that there was deficiency in the completeness of the dosimetry records. And as a result, we felt that, until that deficiency was cleared up -- now, the response again, and appropriately so, by NIOSH was that, well, wait a minute, hold the presses, you know, we're still doing a lot of data capture. And so this may be in that regard. That is, you may be at a point right now where, as a result of your data capture, you have completed your data set and the gaps that we observed in the neutron dosimetry have been filled. And if that's the case, those

asterisks again go away. So it's the same type of question we had before when we discussed the earlier matter on the need for a coworker model for gamma.

DR. TAULBEE: Okay, alright. I think I'm understanding. I'm still having a little problem. I mean, to me, I see this as a TBD issue from a standpoint of, given the vast amount of neutron records that are available for the site. As to whether we end up applying a coworker or a ratio type of methodology to this workforce or not I don't really see as a TBD issue. It's more of a methodology -- or SEC issue but more of a TBD issue.

DR. MAURO: It becomes an SEC issue if there's no way -- let's think TAN. You've got all of these different sub-areas where the operations are quite different. And let's say you do have a fairly complete data set, but it's not, you know, but there's a need for a coworker model again, you know, the need for a coworker model, and if the data set is such

that you don't know where the worker worked, then you have a problem. You cannot pull all the neutron data, let's say for TAN, and from that create a coworker model because each areas are different.

So the reason this is here is premised on two things: one, that there may very well be a need for a coworker model because we did find data gaps at the time that we looked at the data. Now, that may no longer exist, and the problem goes away. And the second part is, if there are data gaps and there is a need for a coworker model, then it's important that the data set that you do have identify where the workers worked because you will need, if there are data gaps, you will need coworker models for the different sub-areas within TAN alone, just within TAN, because of the enormous differences in the nature of the exposures.

So that's the reason why the asterisks are still there. The extent to which

that problem has gone away, that may very well be the case, but SC&A has not reviewed that aspect of it, of the latest work.

DR. TAULBEE: Okay.

MR. KATZ: Thanks, John. I think that conversation is useful for John Stiver for his presentation.

MR. STIVER: Yes, we did touch on this last November, but it was before Tim and the additional data. Again, I think it's something, unless you guys want us to go ahead and pursue that and tee it up for --

MR. KATZ: I think it's worth just presenting at the Board meeting. Hello? Who's this? Hello? I thought someone was trying to -- we're about running out of time for Bob's -- do you have a five-minute version that you want to give or --

Evaluation of Monitoring Practices for Claimants at Argonne National Laboratory-West

MR. BARTON: Let me just, quick, go through the -- can you all see this on Live

Meeting? Okay. Well, I just wanted to quick go through they were 50 random, and when we looked at them we got a nice bell curve of employment dates, but the employment span in the actual SEC '57 to '58 was kind of, we didn't have a lot of information on that. So we went and got ten more focused that weren't part of the random sample, and we looked at those. They're mostly ANL-West workers. There are some subcontract workers, and these other workers are from Aerojet, which I think they were just borrowed from INL because I think that was mostly at INL.

We got a lot of different job titles. I'm on page 11. Maintenance and construction were the biggest chunk of that, so we covered a lot of those types of workers that are sometimes problematic, but also engineers and technicians.

The first finding was related. And Tim mentioned he's got in his notes to go look at them, but, basically, we have a worker who

has internal dosimetry and no external dosimetry, and there seemed to be some confusion at the site about the location file card saying two TLD, which they had interpreted as two long-term disability instead of two thermoluminescent dosimetry. So, again, we kind of present that argument through page 24, so that was, basically, we need to figure out what went wrong there because there's like a decade-long, decade-plus long period where we have internal dosimetry and no external.

Finding two was a gap observed in the 70s, mid-70s, for fission and activation product monitoring, something that's been mentioned as the coding effort to get a better handle of what's going on there. There's a Table 6 on page 42 which kind of really illustrates, and this gets into Privacy Act information, but you can see why this kind of piqued our interest. You have a lot of workers who were monitored, and then it stopped, and then a lot of them picked up later on in the

late-70s. So you're like, well, what happened, the job probably didn't change that much.

Finding three and four were related to those ten additional claims where we were focused on the SEC period. And the first one, finding three, was again another worker who had internal dosimetry in the mid-1950s, but then we didn't see external dosimetry until about 1963.

The other finding, for these ten workers we noticed that really the change in external dosimetry appeared to have a little further into 1958, specifically you have sporadic external monitoring for these workers, and then, you know, end of March 1958, suddenly they're on a weekly external dosimetry exchange schedule and, like, witnessed that for six of the ten relevant claims and a bunch of them didn't even apply. And also in some of the randomly-sampled claims, we also observed that. It's maybe something we should consider. It's a small, small portion. You have one-quarter

that could potentially be added.

Observation one, this is just simply that we observed in a lot of cases they only had the annual external dose summaries, and so we really need to get the extra information so you can do dose reconstructions because you need to know how many badging cycles. That's not an SEC issue because you can bound it by just saying 52 cycles or something like that, but it is also important for neutrons because, normally, in the annual, they would just report neutron of zero, so now you'd be assigning a whole lot of missed neutron dose. And, again, it's an observation, not an SEC issue.

DR. TAULBEE: Let me interrupt. Is that the difference between your findings and your observations?

MR. BARTON: Yes.

DR. TAULBEE: Because, really, SEC issue versus TBD-type issue?

MR. BARTON: Yes.

DR. TAULBEE: Excellent, thank you.

That's the first time I've heard that. Go on.

MR. BARTON: Let's see here. Observation two was really just I wanted to inform the worker that when you go through these individual workers and you see a gap in external monitoring, sometimes it's not because they weren't monitored. A lot of times it's because there are other reasons.

So page 23, observation two, talks about a case where the person was employed from basically 1960 all the way through the 2000s, but there were only two years that had missing data, '78 and '83. We found evidence that in '78 it was probably over at NRF, the reason why he doesn't have dosimetry in ANL. And also the survivor indicated several other locations that this person would travel to, which could explain some of those gaps. So it was pretty much a lesson that just because you see a gap doesn't mean there is a deficiency in the external monitoring program, but in other cases there is evidence, such as the internal

monitoring, that you really have to be able to track it down to figure out if there's a problem.

Observation three was again another situation where the difficulty in establishing the actual employment periods at a given site is very difficult. It's a very difficult job for DOL, so a lot of times --

MEMBER BEACH: And while you're on that, is there some reason why finding three didn't make your summary and conclusions? Was that just a process thing or --

MR. BARTON: I thought I had tied it in with one of the other -- are you talking about the end section of the report? I thought I had tied it in possibly with finding one about where it appears --

MEMBER BEACH: Oh, you sure did. Thank you.

MR. BARTON: Okay, excellent.

DR. TAULBEE: So some of your observation three, again, this could be

partially alleviated once DOL codes all those temp badges. Then you could try and find people.

MR. BARTON: Yes, absolutely. Observation three was, again, how difficult it is sometimes, especially if they're subcontract workers, to say, they actually have to say, so, again, when you see this person had 15 separate covered employment periods at ANL and another 11 at INL that didn't overlap, and they had security records, but there was also some indication he might not even be there. So, basically, it was something I wanted to point out to the Board that, oftentimes, when you see a gap, it doesn't necessarily mean there's a deficiency. It could be for any number of reasons. And that's not a knock on DOL at all. When you look through the job they do to try to establish employment, it's pretty admirable.

Main observations. This had to do with extremity monitoring. It's very sparse. You can look at some of the charts in there.

And, basically, what we concluded is, you know, in these cases, I think NIOSH often employs, I believe it's OTIB-13, and so we thought it would be instructive to go back where you have data of a regular dosimeter and an extremity ring badge and compare those ratios to see how OTIB-13 stacks up and if it's applicable and bounding to INL. We thought that would be instructive.

DR. TAULBEE: I might also add about that extremity monitoring data, we run into a lot of that during our data capture, so we could not capture it. And so it sometimes provided with claims but not always. If it's skin cancer, then we might go after and request more.

MR. BARTON: Usually, it's paired with external dosimetry. It's like dosimetry code six, as opposed to dosimetry code one. And so you'd have two measurements for one worker on the same badging schedule, so that's why I say you could use those data points to

compare. It's an observation. I don't think it comes to the level of an SEC issue.

This one about neutrons which we kind of just discussed with John Mauro and, basically, the ER made a curious statement. I'd actually like to read this. The available information also indicates that ANL-West investigated neutron exposures to unmonitored workers and estimated doses for those workers. That's something that I think should really be explored a little bit more and also the protocols used to assign neutron dosimetry, you know, which workers, what types of jobs would be very instructive to know why neutron monitoring is so sparse. But the fact that they investigated unmonitored workers, to me, suggests that you had unmonitored workers that were actually exposed or potentially exposed.

DR. TAULBEE: I think the interpretation should be neutron unmonitored. They were film badge monitored --

MR. BARTON: Neutron unmonitored,

yes.

MR. KATZ: And we're down to 30 seconds.

MR. BARTON: I think that's it.

MEMBER BEACH: We may ask you to do that again.

MR. KATZ: A repeat performance. We are adjourned. Thank you, everyone, for hanging with us on the phone.

(Whereupon, the above-entitled matter went off the record at 3:21 p.m.)