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

+ + + + +

ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

+ + + + +

WORK GROUP ON LOS ALAMOS NATIONAL LABORATORY

+ + + + +

MONDAY
MAY 14, 2012

+ + + + +

The Work Group convened in the Zurich Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Mark Griffon, Chairman, presiding.

PRESENT:

MARK GRIFFON, Chairman
JOSIE BEACH, Member
JAMES E. LOCKEY, Member
WANDA I. MUNN, Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
TERRIE BARRIE*
ROBERT BURNS, ORAU Team*
ANDREW EVASKOVICH
JOE FITZGERALD, SC&A
STUART HINNEFELD, DCAS
JENNY LIN, HHS*
GREG MACIEVIC, ORAU Team
JOHN MAURO, SC&A
CHRISTOPHER MILES, ORAU Team
DAN STEMPFLEY, ORAU Team

*Participating via telephone

I-N-D-E-X

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

(9:06 a.m.)

MR. KATZ: So, good morning everyone in the room and on the line. This is the Advisory Board on Radiation and Worker Health, Los Alamos National Laboratory Work Group and we are ready to get going here.

We begin as always with roll call, with Board Members, and we are speaking about a specific site, so please speak to conflict of interest as you register.

(Roll call.)

MR. KATZ: Okay. Very good. The agenda for the meeting is posted on the Board's website, under the Board section of the website, under meetings, as are the papers that have been exchanged. They are all from DCAS. I think there are three of them and they are all posted on the website with the agenda.

And Mark, it's yours. Please,

everyone on the line, mute your phones except when you are speaking to, and if you don't have a mute button press *6 to mute, and then *6 to *6 to take it off mute.

CHAIRMAN GRIFFON: All right, we're reconvening this Work Group. I am trying to remember the last time we had a Work Group for LANL. Do you have a date? About a year ago, right, yes.

And I also, this agenda, with the help of Joe, put together this agenda, and some of them might actually, some of the sub-topics, are, are cross-referenced to the matrix, and I have a matrix -- which, the latest one I have found, well, one version, is dated November 1st, the other is November 3rd, 2010. I think they are -- that's the most current version of the matrix.

What I will do, just to keep us fresh on this because this happened -- we haven't had many of these Work Groups, is

update this during the meeting and go through the actions, so that we have a sense of where we're at the end of the meeting.

Looking down the agenda, I think most of our conversations will be early, which is good, I mean, on the -- most of the work that was done was on the mixed fission and activation products information and the exotics, I believe, and maybe some more on neutrons as well.

So other actions, I think there was less progress. But I think we should just go in order down the line, and start maybe -- we'll do the back and forth like we usually do with most of the actions, I believe, from the last Work Group, were in NIOSH's court.

So we will let you guys start off for, you know, each item, and then --

DR. MACIEVIC: Well, I was wondering if, since we, Joe and I had a -- relatively several emails back and forth, if maybe you

want to start from that point, or go from --

MR. FITZGERALD: Well, what I would propose we can do is, since it's been a while, let me give you a backdrop of where we have come from, and then hand it off to you in terms of the most recent response.

I just want to make sure -- so we connect the dots again.

DR. MACIEVIC: Okay.

MR. FITZGERALD: It's been a year. In terms, you know, this first topic of course is the dose reconstructability of mixed fission and activation products by 1976, and of course the SEC that was approved was for Los Alamos through 1975. The premise for supporting dose reconstructability after '75, in other words '76 forward, was the advent of the in vivo technology, the whole-body counting technology at Los Alamos which came online, I believe '69, operable by '70, and the notion is that by '75 certainly it was up

and running and data was being generated that would enable one to certainly monitor for mixed activation products and mixed fission products, if not exotics as well.

In the last couple of rounds of discussions, the Work Group, requested that certainly NIOSH provide some validation that in fact the data was available, that was adequate and that there was a dose reconstruction approach that could be demonstrated using that data.

Now, if you go back to the Evaluation Report for petition 109, and this is pretty much what it says is, you know, that in vivo counting methods were well established and available for bounding intakes of -- I'll say MFPs, mixed fission products, and MAPs, mixed activation products.

And OTIB-54 is, is the guidance document cited as the means to calculate intakes of both fission products and

activation products, based on cesium-137. That was cited in the Evaluation Report, with cesium-137 coworker data provided in the LANL coworker study, which is OTIB-62. So it's two key documents -- 54 is the sort of the process document by which cesium-137 is actually used, and the coworker report, study for Los Alamos, is OTIB-62.

So what was proposed is that cesium-137 be used as the marker for mixed activation, mixed fission products and that would enable the coworker model to be used for determining dose reconstructability for intakes of fission products and activation products at Los Alamos.

Now, we questioned, in our first round of review, NIOSH's use of cesium-137 as the substitute nuclide in the ER, okay, that was where we started, mainly because that's only useful if the ratio of the surrogate, in this case cesium-137, to the unmonitored

nuclide is known, that you can actually figure out what that ratio is, and it remains relatively constant.

So if you pick a certain ratio value against, cesium-137, it's something that you need to be able to establish is known for the other nuclides and that it's relatively constant over time in the different facilities that you are going to use it for, if you are going to go that route, and that's what's expressed in the Evaluation Report.

And, you know, as we said, the ER refers to OTIB-54 as a method to assign, again, MAPs and MFPs, unmonitored intakes. However, as we pointed out, OTIB-54 is based on a defined reactor type and known radionuclide ratio, and doesn't even include mixed activation products produced by accelerators.

So the first problem we had with that proposal and Evaluation Report was how

one is going to handle mixed activation and mixed fission products after 1975, is that the OTIB that was going to be used as the means to do that doesn't apply to mixed activation products from accelerators, and doesn't apply to non-reactor nuclear facilities like the chemical metallurgical -- the CMR, that facility, and some of the other non-reactor nuclear facilities.

So you immediately have a problem because those ratios which are actually in that document were meant for reactors, okay, there's a history of how those -- how cesium-137 is used as a marker and how those ratios were defined. That really applies in the context of reactors and not other types of operations.

MEMBER MUNN: Have you shown that it does not apply?

MR. FITZGERALD: Yes. We had that discussion in the very first Work Group

meeting and there was an agreement around the table, particularly by NIOSH, that it would not apply.

MEMBER MUNN: And what have we done about it with respect to procedure?

MR. FITZGERALD: Well, that's, that's one we get to.

MEMBER MUNN: Oh, all right. Okay.

MR. FITZGERALD: You know, I think it was a recognition that well, that's a change. There was a recognition that yes, you know, if you're going to go with, go with cesium-137 by way of OTIB-54, it does have to be a reactor-type facility and the facilities we are talking about: LAMPF, which is an accelerator; CMR, which is a non-reactor nuclear facility, doesn't fit the bill.

So I think that was the starting point for some of the actions that we got into in terms of the mixed activation products.

Now, splitting this up, talking

about mixed activation products first, leaving the mixed fission products for second, NIOSH agreed that cesium-137 would not work as a substitute rated nuclide and proposed a new model based on using ratios, and this is for MAPs, of air monitoring data, and this is specifically beryllium-7, which is one of the longer-lived mixed activation products that is emitted by the accelerator, and using that as a marker instead, and using that as a way to get to the other mixed activation products by applying a ratio.

And I think at the time we thought that was a thoughtful and a constructive approach to the issue, meaning that you have a lot of relatively short-lived mixed activation products, and how do you actually get a handle on the what the concentrations might be for the facility if not for the broader lab for what's being emitted, if in fact it's relatively short-lived. It may be copious in

amounts in terms of curies, but they're relatively short-lived.

So what NIOSH was proposing is that beryllium-7 is one of the longer-lived ones, and that there was a fair amount of data that could be used.

And the Work Group agreed that this approach ought to be looked at, but the question at the time was, you know, is there enough data, you know, is there enough beryllium-7 data that one could apply that?

And then the second part of that question is, you know, how representative was the sampling information being used to come up with these ratios of beryllium-7 to everything else, all the other MAPs of consequence.

And could we have confidence that the rations were in fact relevant and consistent and bounding if you are going to go ahead and go that route.

Now again, this is a backup plan

using OTIB-54 and cesium, now using beryllium so the question is, is there enough beryllium data, and then can you really rely on those ratios?

And that's pretty much the, I guess the charter, and Greg can correct me if -- and try to validate the availability of the data and the representativeness of the ratios.

So that's sort of the lead-in to, I think, your discussion.

DR. MACIEVIC: Okay, the question about using beryllium and the sufficiency of the data and the -- had a total, I believe, of to start out with, 3,000 air samples that were used and it got whittled down to a group of about 1,000 air samples or so that were used to do the comparison for beryllium to the other short-lived radionuclides.

And I need to point out is that we are not doing a dose model based on those ratios. What we are doing is taking those

ratios then -- and applying that to whole body counts where you are actually getting the dose from a dose measurement and using that as an indicator for a scaling factor for the dose body count.

So we are not trying to develop a model from those ratios. So it's really, in a facility, you want to know, based on the samples that we have taken, is that relatively constant over the periods of time that we checked and we have seen that it is, that that ratio of beryllium to the other radionuclides, since that is the most -- longest half life and most prominent one there and the other radionuclides' ratio to it, that it is a value that is applicable from, like I said, a set of several thousand or from a set of a thousand samples that were used.

So we feel that is a good, or sufficient base to use to measure, or to use as a scaling factor for the actual dose that

is going to be computed.

As far as the cesium issue, yes. We dropped that issue on OTIB-54, saying that wouldn't be relevant to use for reactors. But what we found, we have bumped previous data captures and this current data capture and put samples of these in the -- from the SRDB and that are mentioned in our action response.

What you have from these facilities is bioassay that is used and the gamma-spec and the bioassay from CMR and other facilities to come up with the measurements for cesium that we are talking about. So we are not using air samples or needing any kind of ratio in that respect, because we are actually going to use bioassay information to come up with a cesium calculation that would come out of the bioassay measurements that do exist for cesium and like I said, they are gamma spec, so you end up with, and there's later in a table in here on the whole body counts and bioassay,

where there's the -- gamma spec gives you a whole range of radionuclides that were found in the urine as they did the samples.

So one of the reasons that, as we talked about in '75 as a period, when we went to '75 it was the end of the SEC, whatever that was, 51, SEC-51, the first SEC for LANL.

So we took that date, the whole body counts and that being like you said, in the early '70s, and move up. So at that point they did have alpha spec, gamma spec, a whole system of nose wipes, RWPs, SWPs, that were used,, that do pinpoint the use of cesium and cesium bioassays pointing to people needing to leave bioassays for cesium or other mixed activation product type of things, in -- on these work permits, and there are examples, more examples that we found from it.

And our whole purpose, and what NIOSH is trying to do in the ER, you have all kinds of information, you have air sampling,

the contamination surveys, a nose wipe system, all that to show that there was a system in place. We are not saying it's a perfect system that is in place, because there were incidences, as Andrew, the petitioner, points out, there's incidences, Tiger Team had questions on things.

But what you wanted to show is that there is a system in place that monitors -- we'll get into this in later issues -- but for alpha, the actinides and other exotics, there is a system in place.

The dose measurement component comes from our model that says you are going to use the plutonium bioassays, that we will then take all the actinides, and pick a certain percentage of this, because there's thousands of bioassays for plutonium, and for uranium.

So you are going to take those intakes, based on those models, and then apply

all of the actinides to a particular -- if you take a particular year and say the 50th percentile of the intake in that year, you will take all the actinides, run them through and see which gives you the highest dose, and there's issues about presumptive cancers in that which we believe gets nullified by this, because what you are doing is taking, if you were going to pick only one actinide to associate with a particular intake, you could say well that's not going to cover the dose. There may be a presumptive cancer that has a larger dose associated with it, if you were different. But the fact that you are taking all of the actinides and running them to find what is the highest dose that you get from a 50th percentile, say, intake, that is the dose that is going to be assigned to the Class of people that we are talking about in this ER.

So the survey data is really, and our searches, are to say there is large

volumes of survey data, there are the actinides or the exotics.

Fission products and mixed activation products are mentioned much more often than the actinides. That, we get -- in looking through the checklists and other things, they do not mention those, and that's how our -- we will, I'm jumping ahead of myself on other things, but for this issue here, that's where it stands as far as using the beryllium for ratio purposes only, not for dose purposes.

And we do feel, from this sampling and from previous samplings, that there is, I mean, and then the question gets to being what's sufficient, but we believe that a thousand samples with that, is sufficient to base that ratioing on, that the number we are having for a scaling factor for the whole body count --

CHAIRMAN GRIFFON: Can I ask =

DR. MACIEVIC: Go ahead.

CHAIRMAN GRIFFON: Can I ask one question? I think Joe will probably have more followup, but just one question. On the thousand samples, what -- can you describe those, over what time period they exist, were they stack samples, were they workplace samples, what --

DR. MACIEVIC: Well, they're air samples --

CHAIRMAN GRIFFON: Air samples --

DR. MACIEVIC: and stack samples from the actual facilities that LAMPF --

CHAIRMAN GRIFFON: Air samples, workplace air samples and the stack samples come on, or, or --

MR. MILES: I think it's mostly stack samples. There had been isotopic information --

CHAIRMAN GRIFFON: Right.

DR. MACIEVIC: This is from the --

CHAIRMAN GRIFFON: If you look at the ratios there --

DR. MACIEVIC: From the filters on the stacks.

CHAIRMAN GRIFFON: And over what time frame? Was it like '75 on or was it, do you recall? I didn't look at those spreadsheets.

DR. MACIEVIC: Yes, I unfortunately don't recall.

MR. MILES: It was over a good section of that time, right?

CHAIRMAN GRIFFON: Seventy-five, to the end of the -- 2005 --

DR. MACIEVIC: Right. Well, it's not a sampling just of one short period. It's over a length of time from all these samples being drawn. It's not specific to like, well, a five-year period.

CHAIRMAN GRIFFON: And you mentioned gamma spec and alpha spec. They

started using gamma spec and alpha spec in what years? Not for bioassays --

DR. MACIEVIC: Well, gamma spec they were using in --

CHAIRMAN GRIFFON: The gamma spec --

DR. MACIEVIC: Definitely in --

CHAIRMAN GRIFFON: Right, but what about -- you'd mentioned alpha spec?

DR. MACIEVIC: Alpha spec comes later on and I don't remember the exact year, but that is also being used in things such as the actinides.

CHAIRMAN GRIFFON: For the actinides, beyond just plutonium and uranium?

DR. MACIEVIC: Right.

CHAIRMAN GRIFFON: And other exotics.

DR. MACIEVIC: Right, well, you look and see the -- the thing is, is that you are controlling, because you had a plutonium

alpha question and uranium that are the main players in this whole thing, but there's controlling based on that and also doing alpha surveys and alpha surveys that are being involved and contamination surveys, would include any alphas that are produced from these actinides that are in there, because you are talking -- the bulk of the actinide work, 1972, around there, that period, where it pretty much, the heavy duty work where there was much more actinides, potential for exposure was pre-'72. So, post that period now, you are having whatever kind of residue is there and smaller activities going on, so another reason why you do not see, and you will not see, and even up to current date, you do not see mention at the site of any bioassay or type of thing where there is a bioassay program for curium or neptunium or any of these other radionuclides, even as of today, they are not doing they type of work.

MR. MILES: Scale.

DR. MACIEVIC: On a production scale, right, in the laboratory scale, yes.

MR. FITZGERALD: Yes, I think when we talked about this at the last meeting, and it was acknowledged that cesium-137 didn't work for the reasons that we discussed, and the beryllium step was proposed, I think we said that seemed to have merit, and -- but again, if we go back, we were concerned about whether there was enough beryllium-7 data for the time frames in question. That was the first question, data availability.

And the second question was the reliability and representativeness of the ratios, because again, beryllium-7 of course is one of the activation products of interest, particularly from LAMPF, but you know, there's others that clearly play into the exposure pathway to workers.

So I think the Work Group wanted to

get a validation on the availability of the beryllium-7 data and then a validation on the representativeness of the ratios that were going to be used.

And on the availability side of the beryllium-7 data, there was a spreadsheet I think you posted to get to the actual number. Let me see. Yes, it was 106515 was the SRDB number, 106515. And it was a spreadsheet of the, of the emission data, including beryllium-7 from LAMPF.

And looking at that data and sorting it, just sorting it by beryllium-7 by year, certainly there's beryllium-7 data from '76 forward, but there's two years missing, from late '76 to early '78 I think.

So, certainly there's a little question there. Now, maybe that can be extrapolated or some sort, but the data before 1980 is either missing or relatively small compared to the data for beryllium-7 after

'80, which you know, becomes much more plentiful.

Beyond the distribution issue though, I think more significantly, is -- would be my concern of the ratios. When we discussed this at the last meeting, the sense was we understand you are taking stack samples, but how do we know those samples off the filters are reflective of the relevant activation products, and representative not only of what you are seeing, you know, coming out of the stack, but actually representative of the exposure that the workers would be exposed to and its -- again, not the quantity, just the ratios.

And let me add, some of the SRDB documents that are on file, and I have the numbers, here's the environment, working environment, the operating environment at LAMPF is certainly more complex than that method would reflect, that you have a variety

of mixed activation products, depending on the chemical compound, composition and form.

Certainly, the filters were filtering out the particulate activation products, you know, the heat filters, the charcoal. That's getting the heat.

But you also have a fair amount of gaseous activation products. This is where you are shooting the beam through air so you are forming isotopes of oxygen, nitrogen, carbon, whatever and that's all flowing out.

That's proven particularly meddlesome to LAMPF, because you really can't capture, it's just, that's -- you're, you're releasing it, emitting it, and it's a fair amount of -- short-lived admittedly -- but a fair amount of curies going out the stack.

And, and looking at the documentation that you have there, and I can provide that at the break, but the facility itself has struggled with how to figure out,

you know, how much -- what the complement is, what the concentrations were, what the proportional ratios of the carbon to the oxygen to the nitrogen, all these gaseous forms.

Because it really depends on the beam time, the beam power, the energy of the beam, the targets -- we had a lot of variables involved at LAMPF that would have a direct bearing on how much of this gaseous MAP that you would be putting out.

And there was a lot of concern about that, not the last of which, from the EPA, because again, LAMPF represented a fairly significant source term for environmental releases at the lab.

So you had, you know, you certainly had the gaseous, GMAP, they call it, gaseous mixed activation products, and you had of course the particulate mixed activation products, which you certainly would be picking

those up in the stacks. But you also had those available in the workplace because workers would go in when the accelerator was down, doing maintenance and other support activities, and that's what these workers would be exposed to, would be residual contamination on the -- on the surfaces from some of these particulates, particulate MAPs.

That further complicates the picture, and again this is in the SRDB documents, you have vapor activation products, and this is because they were using water to pool the magnets in some of the target, the actual targets.

And with the presence of water in the target area, you would get vapor produced, and that's another issue, and they would monitor for that, and that to some extent is why they had the charcoal filters, was trying to capture some of that.

And I guess the picture I'm

painting is that the site and LANL struggled all the way up into the '90s, trying to figure out, you know, exactly what was being released and particularly on the gaseous side, had real problems figuring out what the proportions were, because it was experiment-specific --

CHAIRMAN GRIFFON: And I guess the other thing that was mentioned in the Work Group meeting last time was the hold up time to, or the --

MR. FITZGERALD: Yes, the hold up issue, we kind of mention that --

CHAIRMAN GRIFFON: We had questions on that --

MR. FITZGERALD: We had questions on that, because -- clearly because of the half life --

CHAIRMAN GRIFFON: Which would affect your ratios at the stack, obviously.

MR. FITZGERALD: Right, the hold up, the facility had, had hold up in the

lines, just because some of it was relatively short-lived, that in a matter of minutes you wouldn't have anything to worry about.

So they did have some hold up, and they got in some trouble with EPA, which I think even the petitioner raised, this compliance issue, in the early '90s, where it was a disagreement over how much credit the lab should take for hold up, because I think EPA was contending that it wasn't being held up as long as the lab was, was claiming, and that would have some impact on the estimation of the gaseous releases.

So there was a lot of play on, you know, exactly what was going out, how much, and again, this became a compliance problem later on.

But certainly all along there was a great deal of difficultly even figuring out what was being environmentally released, because you had these different forms of MAPs,

and different experiments being run, the energy that was being used in the accelerator varied.

So it was a -- if you can think of a facility, almost the opposite of a production facility, where you are running different experiments with different targets, every time you changed the target you got a different configuration of what was going on in the air, because the impingement of the beam would give you a different, different emission, if you want to call it that, a particulate emission as well as a gaseous emission.

So all those play into it. So the picture that is painted is fairly complex, and that's why I think we were concerned that if one is going to use beryllium-7 as a marker, and assume that all the other MAPs ratioed against that, I think that's a fairly tall order that one has to look at rather carefully

because of the nature of the beast, the nature of the facility, that it's -- looking at the filters alone, and banking on those at one point in time for example, being reflective I think, it wouldn't work. It would have to be something that would be over some length of time, sort of a bounding approach that would have take the maximum.

It would also have to consider all the different forms of activation products that were being generated at the facility and not just the particulates but the gaseous as well as the vapor, and make sure that those ratios could be captured and bounded that way.

It's not an easy thing. I mean, -- in looking through these documents on LAMPF, it's a much more, even more complex than I remembered it, and they were struggling with figuring out what they were releasing, let alone trying to do it sort of after the fact and looking at ratios.

I think I even saw something in here where, in '82 or '83, KANNE, the KANNE monitoring instrument on the stacks, that's part of what they used to monitor for.

They found that was 30-some percent off. It was underestimating what was going out the stack by 30-some percent so they sort of sent a memo around saying okay, from here on out, up the estimates by 30-some percent because we were off. It wasn't calibrated right.

So this, again, was a very difficult proposition.

CHAIRMAN GRIFFON: So can you speak to the -- I mean these short-lived, these other ones that we have a concern on, that I have a concern on the ratio estimate? Can you speak to the dose consequences from those shorter-lived, the gaseous, the vapor --

MR. FITZGERALD: Yes, I mean --

CHAIRMAN GRIFFON: I mean are they

--

MR. FITZGERALD: LAMPF, yes, I don't think there's any dispute LAMPF was a bit of a bad actor as far as the emission. It was the -- I think one of the documents acknowledged as the highest source of radioactive emission in the DOE complex, which I -- again, I didn't recall that, but reading it again, it was a fairly prolific emission source.

Now, the saving grace was most of it was relatively short-lived, so that even though there was a lot of implications for the fence line as far as the general public, most of it didn't get to far because it was relatively in minutes, you know, 10 minutes, a lot of it was just mere seconds.

So taken all together, it wasn't a big impact to the public, even though it was in fact measurable at the LANL boundary.

The issue we have, of course, is

that the workers who worked on-site, in the buildings, would have been up close and personal, so that even though it was a relatively short half life, you would have an environmental occupational dose by virtue of the copious amounts that were being released, that would be relatively high, that you know, your exposure, I mean, you are talking millirem, it's not high in terms of rem, but high in terms of the fact that the -- unlike most places, the environmental occupational dose at LAMPF was not insignificant.

There's one paper in here, again I can get the SRDB number, that notes that 25 percent of the occupational dose for LAMPF would be attributed to the ambient emission concentration levels on site.

Now, this is concentrations not only from going out the stack, but also diffusing from the -- in the facility itself. So, and the rest of it was neutrons

basically. So it was a contributor to the occupational dose at the facility.

MEMBER MUNN: So, Joe, let me clarify for the slow learners among us, exactly what the concern is here. The concern is that we have moved the what is the appropriate ratio, and should be ratioing at all.

What I think I am hearing from you is we are concerned about what was going out of the stack because we don't know exactly what that was at any given time due to the difference in the, the type of activity that was going on. And by activity I mean physical activity. I don't mean radiological activity.

So what you are trying to say here is -- you haven't actually said it -- but what I have received as an inference is, since we apparently don't have what someone thinks is reliable badge information about people who were there, because what you were saying was,

you had this plethora of small quantities of radionuclides which are being emitted, many of which are gaseous, and for some reason you don't think that the badging program was adequate to identify what that effect on human beings would be?

I mean, you see, if we are -- if we are concerned about this, we are concerned about it because of its effect on human beings.

MR. FITZGERALD: Right.

MEMBER MUNN: And if we have our human beings badged, then regardless of how short-lived and regardless of how small, the implication is the badge should tell us where our -- our urinalysis should tell us.

MR. FITZGERALD: Well, it doesn't. See, let me --

MEMBER MUNN: No, I know, I know, we are not testing -- we are not testing for --

MR. FITZGERALD: Right.

MEMBER MUNN: Radionuclide known to man. I understand that. I understand that. Not even testing for every radionuclide that is known to be emitted by LAMPF. I understand that.

But if we have badging processes which are good badging processes, and they were pretty good at LANL, these folks knew what to be concerned about, and they did a lot of work trying to make sure that people were badged.

Now, are we discarding that entirely? Are we saying, well, since the filters didn't catch all the gases and since the stack monitor was under-representing what was going up the stack, that we don't have information about what we need to use?

MR. FITZGERALD: Now, let me, let me just back up. Los Alamos -- we're not, you know -- Los Alamos, along with Oak Ridge and

then in health physics, you know, I don't want to get into, you know, this -- does Los Alamos have a comprehensive, sound health physics program. I don't think that's the real issue here.

Because even before '75, in the prior SEC, I wouldn't dispute the fact that, you know, I knew Hi Nancy,

Please see the reviewed ABRWH MD WG 041012 transcript.

There were a few personal identifiers removed. This document has the necessary redacted language inserted ‘identifying information redacted’., he ran the internal dosimetry program at Los Alamos, and you know, he definitely knew what he was doing.

However, -- however, the issue is that there was no way to monitor personnel who made and were potentially exposed to these

mixed activation products, mixed fission products, talking about activation products from the accelerator.

This is where the long laundry list of very sort of exotic, but thankfully short-lived stuff, it doesn't stick around very long.

MEMBER MUNN: I understand.

MR. FITZGERALD: Now, the issue is with the in vivo counter, the whole body counter coming on the scene at Los Alamos in the early '70s, that certainly was -- provided the prospect that okay, now we have something that is sophisticated and precise enough that we can -- we can perhaps pick these up, that we can actually get monitoring data for people who were exposed to these things, even though, you know, albeit these are short lives and that's one of the problems with even the whole body count, you can only see what was still there.

Now, the original proposal was cesium-137 but now we are looking at beryllium-7 because it's long enough lived that there were people that went through the whole body counter who worked at LAMPF, for which we have beryllium-7 data.

So right away, we are saying okay, we can see a pathway to addressing this issue. But beryllium-7 is just one of a large list of mixed activation products that were admitted from the facility.

MEMBER MUNN: Which changed with every procedure.

MR. FITZGERALD: Right, which was very variable on the site, so how do we know, one, that there is enough beryllium-7 data to begin with, because at the last meeting, when this was proposed, there wasn't any sense of how much there was, of beryllium-7, so that you could base, you know, you would have a reasonable amount to base it on.

The second question was, since this all hinges on being able to use beryllium-7 as a substitute, could you demonstrate that the ratios that you would plan to use would be reflective of what the workers were in fact exposed to on site?

A very basic question. Two very basic questions. Do you have enough beryllium-7 data and how sure are you that these ratios would be useful and bounding for the site? And that was it. That's how we left it. We said it's a promising approach.

So the response that we got, and we got a spreadsheet, I went through it, yes, there's beryllium-7 data, but two years of it is missing in the '70s and it is rather scant in the '70s but does become more plentiful by 1980, okay? That answers the first question.

The second question, which is what we have been talking about, you know, how representative would the stack ratios, the

stack filter ratios be, of what the workers would be exposed to in the plant, I'm struggling a lot with that because I think in the NIOSH response to, you know, it was said that you know, that documents were reviewed, and it certainly appeared that these were representative. But I went through those documents. There's nothing in there that pins down any of these ratios.

But yet the documents I did locate on LAMPF and the SRDB on the other hand, point to a situation of a mixed activation product production at the plant, very variable in very different chemical forms, not all captured by these filters and for which workers, more than likely, depending on the experiment and the time frame and the nature of the targets, would have been exposed to varying ratios, so if anything it makes it a much more muddled picture as to whether or not this particular approach could be made to work because it

would be difficult to show that you would have a bounding ratio for the MAPs of concern.

So that's where it is. I mean, you know there should be a handle which is beryllium-7 from the whole body counting records, that enables you to get to a dose reconstruction method for these mixed activation products from the accelerator, but it does hinge on whether or not you can answer those two questions, whether you have enough beryllium-7 and then secondarily, whether you can tie beryllium-7 by ratio to all these other significant, both gaseous, particulate and vapor-based mixed activation products, which is the reality of that particular facility.

And I don't think those questions, based on the response, were answered, and that's kind of where we are at. I mean, certainly the spreadsheet helped me see the availability of beryllium-7 and there are some

questions there obviously. But on the other hand, the question of the ratio I don't think was answered by the NIOSH response, it sort of said we -- you know, we didn't find much, but what we did see, didn't dispute our approach, and oh, by the way, we did see from short-lived, I'm sorry, I'm paraphrasing, short-lived nuclides in our data, so therefore there couldn't have been any hold up.

And I think we heard that at the last meeting but felt that wasn't enough, so I guess I would say we still don't feel that's enough at this point.

MEMBER MUNN: And I still don't feel that my concern about the validity of the badge readings has been addressed. I -- why are we not --

DR. MACIEVIC: Well that -- I agree 100 percent on that. That's one of the things that I wanted to bring up. I mean, we -- we are talking about a process thing about a

stack release that is talking about what EPA cares about, and that's not where the issue is.

We are at the issue of, one, you have a badge system that does measure beta, gamma, alpha, and neutron. Beta gamma neutron. It's got it down pretty tight by 1975, '76, and with the neutron -- I'm talking about external. I know. But, but, but, but, but, you have high and you have all these short-lived, how are they giving off their energy, either gamma or beta? A lot of them are gamma emitters.

If you have a person who is up close and personal inside of a gas that is giving off, even over a short time, lots of gamma rays, you are saying that these badges are somehow missing all of that, and you should be seeing some kind of dose, just like you are seeing high neutron doses, or neutron doses --

MR. HINNEFELD: How about internal doses?

DR. MACIEVIC: Yes, but that's a link to it by going and saying that if I'm seeing no external dose --

CHAIRMAN GRIFFON: Is that what you're saying?

DR. MACIEVIC: Well, no, I have to go -- I mean, I didn't say --

CHAIRMAN GRIFFON: Are you proposing external as a surrogate now?

DR. MACIEVIC: No, no, no. What I am saying --

(Simultaneous speaking.)

DR. MACIEVIC: We are moving off-of the issue. You worried about the beryllium-7 and yes, there are surveys, and I have right here, from the --

MR. FITZGERALD: That's what we're talking about.

DR. MACIEVIC: Yes, but -- but for

LAMPF, this is 1975 from the quarterly reports, survey reports, which we of course could go dig up all of these spreadsheets.

But this is just for 1975, laboratory air samples from LAMPF, 909, laboratory swipes 204, laboratory water 11, laboratory other 13, laboratory alpha 639, laboratory beta 893, laboratory gamma 1,352 samples, laboratory tritium 13, laboratory gamma spec 133.

And that's for the second quarter of 1975. And that says -- backs up our whole point there is a program in place. That what you are saying is, is that because of these very short-lived half lives, that the beryllium ratio has to be thrown out, that you can't, we are using that as a factor to modify a dose, that is actually --

(Simultaneous speaking.)

DR. MACIEVIC: You were throwing that out and you cannot use that because it

would be short-lived. If you had a very large gamma-producing, with all these surveys that are produced there, which we haven't produced all 909 from the second quarter of 1975 to show what those are. But you would have found, if this was a constant, chronic problem, and well, we probably have to go back to, because we have been concentrating on neutron dose mostly for LAMPF, but we can also go back and trace the gamma doses from LAMPF over time and focus in on those to go and see why aren't we seeing spurts of large gamma ray doses for individuals that are in there.

Well see, you have to -- if you are putting this whole picture together, you have to consider that if we have an unknown piece which is the short-lived that are producing large dose for people that we are not -- we are kidding, then you have to explain why you are not seeing it on the dosimetry.

CHAIRMAN GRIFFON: But can I ask

just one question on that, the stats you read out, for '75. Is that summary report, do you -- I mean I don't expect you to pull 909 --

DR. MACIEVIC: No, these are from the quarterly report summary.

CHAIRMAN GRIFFON: Do you have any of those, did you look any of those individual --

DR. MACIEVIC: Yes. There's -- yes. We do have some of the data there but we have not pulled out the --

CHAIRMAN GRIFFON: And were you able to use that data in any way to compare? I mean it seems like you rely on the stack. Did that carry a work area air sample? Did that have the information you needed to do the ratio kind of stuff?

MR. MILES: I think the -- I think the work area data was primarily gross alpha --

CHAIRMAN GRIFFON: Gross alpha --

MR. MILES: Gross beta.

CHAIRMAN GRIFFON: Right.

MR. MILES: But what those were, they had followed by, a lot of times, nose wipes, which would then, I don't know, possibly they used those, I would think, as an indicator to send somebody a whole body count.

And we've got, you know, quite a bit of whole body count data for beryllium-7, sodium-22, carbon lead and carbon-13, several others are --

MEMBER BEACH: So your whole body, that's the chart that is in your paper that shows that for beryllium in '75, you have two whole bodies? Is that what I'm looking at here?

DR. MACIEVIC: From that --

MEMBER BEACH: This is your --

DR. MACIEVIC: Yes --

(Simultaneous speaking.)

DR. MACIEVIC: In the responses

section --

MEMBER BEACH: Page 11 of your report just has the total number, I'm assuming it's the total number of whole body counts per year.

DR. MACIEVIC: Right.

MEMBER BEACH: So there's two for '75..

MEMBER MUNN: Is that in monthly reports, from whole body?

MEMBER BEACH: The header says whole body counts per year.

MEMBER MUNN: I'm looking at the area ones.

MEMBER LOCKEY: Table 1 has 17.

MEMBER BEACH: Table 2.

MEMBER LOCKEY: Two beryllium-7 whole body counts, is that what you were talking about?

MEMBER BEACH: Yes.

DR. MACIEVIC: Whole body counts.

CHAIRMAN GRIFFON: Those are whole body counts?

MEMBER BEACH: So that's the total you have for that year.

DR. MACIEVIC: Right.

MR. FITZGERALD: You have two for '75. You have four or five -- eight for '76. You are missing from December '76 to, to the end of -- or early '78, no, late '78, November '78. Then it picks up again in '78, December '78, and you have probably 20 in '79, and 3 in '78.

So you know, that's the, that's the amount of beryllium-7 data. But you know, I think, if I can direct this to the Work Group, the emphasis that we are focused on, and we were focused on where we left off at the last meeting, is not on the reliability of the Los Alamos healthy physics program, but on the method, the methodology, dose reconstruction methodology, okay?

If the ER, Evaluation Report, which is what we are talking about in this petition, doesn't work, which we have acknowledged, and cesium-137, that's what's in the ER, then what dose reconstruction method are you going to use for mixed activation products?

It's a very essential question because this was the basis for cutting it off at '75. So if you have cut off the petition at '75, and the issue is that somehow the in vivo counting in other words enables you to do have a dose reconstruction methodology that gets you there, then I think this Work Group wants to know how does it get you there.

And if the ER is not right, and it isn't right, that cesium-137 and the two OTIBs that are cited in that, then NIOSH, it's incumbent on NIOSH to demonstrate to the Work Group what alternate method is going to be used.

Okay? The alternate method in this

case is beryllium-7, and the ratios against beryllium-7 is how one is going to figure out what the MAP dose is from the accelerator.

Now, all we are asking, I'm not asking about how many surveys did they do. We are just saying methodology-wise, how do you get from beryllium-7 to a bounding dose with mixed activation products, a very basic question. The ER is not correct as it is written. What is the replacement method that is going to be in there?

And we are saying we can see the data. You've got two data points for '75. You've got so many for -- you know, we have looked at that. There's some questions there, because there's two years missing.

But then you get to the question, is how do you know what these ratios are going to be, if that's the method? And I hadn't heard anything of how -- which is the Work Group request from the last meeting, how NIOSH

intends to validate these ratios.

What we have gotten is sort of, we looked at these documents and they seem to support us. And oh by the way, we saw some short-lived nuclides in the emissions and that tells us there was no hold up. I mean, that's, that's literally what I read in the response.

That doesn't -- that's not evaluative in the normal sense of the word. What is the basis for believing that these ratios are bounding for the MAPs at LAMPF, given what I went through and described as the various particulates and vapors and gases and different experimental configurations, how do we have confidence in that?

And when you feed back to me the badging and the reliability and the number of surveys done, that tells me that something isn't being answered, which is the method. What is the method and how do we have

confidence that the ratios which are going to be used in this method have been validated? And I don't hear an answer to that question.

DR. MACIEVIC: Well, I don't see -- in the generation of these radionuclides, do you -- where is the documentation that is showing these nuclides that we are missing, the short-lived radionuclides that are there, that are not in this analysis, I mean, you are -- we -- what we have there, everything that is on these sheets, has all been gone through, short-lived radionuclides, which if there were was a hold up, because some of these are very, very short-lived half lives, and you have them in the analysis. So --

MR. FITZGERALD: Okay, what I am going to give you is the CY '83 and '82 emission summaries, and I'm sorry for those on the phone. I can give you the SRDB numbers.

The first one is 45503, and this is the count year '83 total Los Alamos airborne

releases, and this breaks down to argon, the particulate vapor activation products, the gaseous mixed activation products, and it provides the totals that are being released by those different forms. And here's the definition down below for each of those, also mixed activation products.

This particular SRDB also itemizes the gaseous forms, the carbon-11, nitrogen-13, oxygen-15 as well as argon as far as those gaseous releases. These gaseous releases would not be picked up on filters.

MR. MILES: The primary dose mechanism for those are going to be external though, I mean, if you -- if you look at the dose -- if you are in a cloud of gas and those gamma emitters, they have a very small internal dose component, relatively speaking.

MEMBER MUNN: They're certainly going to show on the badge.

MR. MILES: The badge, the external

dose badge will actually cover the vast majority of the dose --

MR. FITZGERALD: The issue is that the ratios that are being used in the filters doesn't encompass the mixed activation products at LAMPF. That's the only point I am trying to make.

And you know, all we asked for at the last meeting, and I, you know, I could give you all these SRDBs, they're up here, is some validation that he ratios that you are going to apply are applicable to the operations at LAMPF over time and over the different experiments as well as different emissions, some of which are not picked up by the particulates, the particulate filters.

And so far, we haven't gotten that. We haven't gotten any validation at all. And this is just going through what's on the SRDB to say that the environment at LAMPF is such that it's not going to be as simplistic as

just taking the filters from the -- and this is not an EPA issue. This is strictly what are you looking at in the filters that we would be significant from an occupational standpoint, and whether that encompasses everything.

DR. MACIEVIC: Well, obviously this is an issue we will have to go back over then, and you know, do some further analysis, but I don't think, what we are going to also look into is the fact about the dosimetry at the time, because you have a bunch of radionuclides which are good gamma emitters here that we are going to have to do some kind of study then to go and determine what kind of dose you would expect to see from something over this -- from a radioactive cloud for a short period.

If you've got hundreds of experiments done over a period of 30 years, and to try to nail it down for every

experiment that produced every radionuclide, and say was that ever on a filter, I mean you already have asked the question that says you can't do it. So make an SEC for the LAMPF. That's -- that is where that statement takes you.

But we will have to go and show how the doses from the whole body count, the doses from the badges, and the doses from filters and look for some other data --

MR. FITZGERALD: Well there's also -- we are talking about the stack and using that as a surrogate for what's in the workplace but it's also support workers who maintain the facility who go in and actually change out magnets and actually are exposed to the particulates you are talking about. So there's also that --

DR. MACIEVIC: Well, so I have to look at RWPs as well, to go and see the kind of activities they do when the facility is

shut down after a particular shot and they go in and do some kind of activity to see the kind of things they are discussing on the RWP when they send somebody in to an area to do some kind of survey.

Right now, we have -- we have a bunch of RWPs from the facility but we haven't looked at this particular issue to go and say what, you know --

MEMBER MUNN: Those were not casual workers. They were badged.

DR. MACIEVIC: Yes.

MEMBER MUNN: And it isn't as though -- if what we are asking is, in addition to the survey information that exists, that can be relied on, are we looking for additional information as to radionuclides that may have impacted the environmental dose of individuals outside or from miles around?

If that's the question, then it needs to be more clearly defined in my mind

than what it is now, if we are just arguing about whether or not you can use ratios as a valid mode of finding whatever the number is you want to find, whatever it is you are looking for. I think we need to be very very clear --

MR. FITZGERALD: We're only down this path because the hypothesis that we are trying to test is whether or not the whole body counter in fact made a difference, such that one has the data to dose reconstruct against.

Now, if in fact that data is being generated once the whole body counter is fully in swing, then we should have data. Now the -- I guess, I do have a problem because even though we do have data it's not very much. But you know, the whole body counter was coming up into -- online, LAMPF was coming online in the '70s so you had all these things happening at once.

So the question is, do you have enough data, and in fact are you able to come up with a bounding coworker model and dose reconstruction approach for, for example, the workers at LAMPF?

And we are talking about the stack because we don't have a routine bioassay program for all the workers at LAMPF. If we did, we wouldn't be talking about this at all, right?

DR. MACIEVIC: Well there is --

MR. FITZGERALD: There is data.

DR. MACIEVIC: There is data and there is bioassay for people at LAMPF. I mean, this is not like nobody every had bioassay at this facility.

MR. FITZGERALD: But we don't have enough data and enough people in that program, otherwise we wouldn't be looking at the stack data, is my point.

MR. HINNEFELD: This is Stu

Hinnefeld. Can I offer something here? Has anybody taken a shot at a rough order of guess at what kind of dose we are talking about internally, especially from a gaseous emission?

I mean most of -- going back to graduate school, there are several radioactive gases where your major concern was the immersion dose from the cloud, not from -- not the internal dose that resulted, which I think is the point you guys were making.

And so if you have a -- there will be an internal component if you are in a gaseous, if you are immersed in a radioactive gas, there will be an internal component. But it's, it's, I don't know if it's the core, but the major component for certain radioactive gases was the external immersion dose, which is what you guys are saying you should see something -- if this is significant, you should see something on the film badge.

That's the basis of this argument.

So I was just wondering, has anybody done any of the magnitude -- these things are all short-lived decay products, you know, basic internal dosimetry of short-lived radionuclides doesn't give you any internal dose, you don't get enough atoms to have much dose, even over your lifetime.

So have we anywhere -- has there ever been discussion of the magnitude of what we are talking about?

CHAIRMAN GRIFFON: I mean, and that's one of the first questions I asked Joe this morning, was the magnitude of the dose count. But I mean let me just back up one step and say I don't think that is the argument that NIOSH made to us. That's the argument we are hearing today.

(Simultaneous speaking.)

CHAIRMAN GRIFFON: I'd like to see a documented, you know, I mean if this -- you

know --

(Simultaneous speaking.)

You are basically claiming that the doses through these gases or vapors were de minimis. Right?

MR. HINNEFELD: Well, I mean --

(Simultaneous speaking.)

MR. HINNEFELD: But I think -- I don't like that word -- but what I'm saying is, where -- do you want to recommend adding an SEC for a facility, and who knows if we can limit it to LAMPF because it's about assets to LAMPF, if the dose that we can't reconstruct is a couple of millirem a year.

(Simultaneous speaking.)

MR. FITZGERALD: The circumstances are that the previous SEC for Los Alamos was awarded based on the inability to detect or monitor dose reconstruction against mixed activation, mixed fission products, internal -- internal, up through '75.

MR. HINNEFELD: That's what we did in '75. There was no exotic component.

(Simultaneous speaking.)

MR. FITZGERALD: Exotics were cited as something to be looked into. There is mixed activation products, mixed fission products, inability to see the internal dose. Now --

CHAIRMAN GRIFFON: And then we said --

(Simultaneous speaking.)

MR. HINNEFELD: But at least in mixed fission products, and right now we are talking about activation products, I mean fairly short-lived but --

MR. FITZGERALD: Well, but we're going to talk about mixed activation next, but --

MR. HINNEFELD: What I'm saying, my argument was, about a short half life, internal emitter, the standard, you know, you

are going in, you think there's little likelihood for an internal dose from a short half life, internal emitter, because you just don't get enough atoms of it unless you have a really big activity intake. Okay.

If you are talking about fission products, fission products are not necessarily short-lived. Now, fission products have -- some could have some significant dose consequences.

So you can't just say that we have already done this because we have added a mixed activation and mixed fission product. If you'd say mixed fission products, then, well, you know, and the reason you would include mixed activation products on a designation is, well, I can't do the dose reconstruction, you know, and I'm not going to get much out of this anyway, why would I kill myself trying to get a mixed activation product --

MR. FITZGERALD: Well, all we can go by is the Evaluation Report for the previous SEC --

MR. HINNEFELD: Sure. And the fission product --

(Simultaneous speaking.)

MR. FITZGERALD: And you know, and if, if NIOSH is -- want to claim that there is not an exposure potential for mixed activation products after '75, internal, then that's a different issue. But that's not what's being claimed.

And so therefore, if the exposure potential is there, NIOSH has proposed a methodology to dose reconstruct, and that methodology is founded on the presence of whole body counting data, and we are saying fine, is there enough of it and can you use it? I mean --

CHAIRMAN GRIFFON: Along with the ratios from the stack, right?

(Simultaneous speaking.)

CHAIRMAN GRIFFON: There is no argument on the table about using external badge data in any way --

MR. HINNEFELD: No, we are not proposing using --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: It's all -- so you are --

MR. FITZGERALD: We're not proposing anything. We are just saying you have proposed it, and we are saying is there enough data, and can --

DR. MACIEVIC: I don't see what that -- the beta thing is where it goes. We have looked -- in looking at these filters, we would now have to go back and look at how that ratio would change based on the gaseous and other things and what we can find. But how much is that going to impact, as a modifier for a whole body count that's on a particular

person that's done with the whole body count that they do perform. That is only going to be used as a correction factor to up the dose that is on there, based on what they see over a long period of time of this mixture that is out there.

It's not -- we are not trying to go and say, for every shot, that that mixture is always going to be in balance at exactly that ratio every time you do that.

MR. FITZGERALD: You're clearly just bounding.

(Simultaneous speaking.)

DR. MACIEVIC: I'm creating in modifying the whole body dose, based on a correction factor because of these ratios and giving you an extra dose because of it, yes, I would say that is going to be bounding.

Now, we may look at -- you could look at other things but you are not going to go from, say, someone getting, you know 500

millirem to now, oh my God, he actually was getting 5,000 millirem after we put these, you know, very short-lived gaseous nuclides, which, when I'm saying this but we haven't actually looked, because we are bringing in the badge data.

But the, but you know, it's not seen on the badge data. There isn't this large dose out there for LAMPF people here, but now these people pulled it all in, that whole ratio is way off because of it, and that dose from the whole body count really should have been, you know, 100 times bigger than it actually is.

I'm saying you could be within a few percent of it, but I do not feel, from what we have, that you are going to be some -- way above ballpark --

MR. HINNEFELD: This is Stu Hinnefeld, I'd like to make another comment. I think I'm on your side here now on this one.

I don't know that we provide -- I don't know if I have read everything. I have tried to read everything at least, or at least to look at everything before I came in here, because I don't -- I don't know that we provided what I would consider the evidence for our -- we said here's the summary of things we found.

But it would seem to me we would have to be fairly specifically referenced at various points in the document and/or, and I'm not advocating this, generate a table of what we are saying, you know, of this air sampling data -- I've seen that table of in vivo monitoring data, I've not seen a table of air sampling data -- that shows here's what was measured in these air samples, and you can see from this beryllium-7, these other short-lived radionuclides, that here is what we have and you can look at these various ratios, and maybe do some fundamental analysis or basic quick analysis on those short-lived half lives

compared to beryllium-7 and see what kind of a ballpark are you into, in terms of what gets added to the dose from the in vivo count.

I think if you are counting filters with very short half lives, there's an art to that. So I wonder, what did Los Alamos really report? Did they report the activity on the filter, or did they report the airborne concentration that gave rise to that filter, because if your, if your half life is short relative to your sampling time, you can't just count the filter. You have to figure out what activity was accumulating in the filter and decaying off at the same time, so that I can understand what happened.

So you need to have -- to me there needs to be more presentation of the evidence that supports our position. Because you can't ask a bunch of Board Members to dig through 50 to 100 PDFs to find information which are -- and even heavily referencing, even heavily

referencing a document, probably isn't sufficient because you are still going to ask them to go do that, to go find these PDFs and go through that.

It's kind of got to be laid out there to have a convincing argument one way or the other. Right now, I don't hear a convincing argument one way or the other that here is the data, here is what it does for us. It's kind of -- what we have said is we have looked and there is information that allows us to do that and there's a bunch of PDFs out there that add information to them.

Well that doesn't help these guys out. I mean, we kind of have to do that work here if we are going to do this.

MEMBER BEACH: Only you haven't proven '75 is the date, either.

MR. HINNEFELD: Yes, and there is that. I mean there is the -- another option would be does the data get better later on,

and that's -- do we get -- actually get confidence that we are really saying it's been '75 because that's where the thing starts, and -- or is it good in '75, is this technique good in '75?

So there's a couple of points --

CHAIRMAN GRIFFON: And I agree with you, to some extent, but can I ask one more question about the data? Did -- this is in my notes also -- on who got sampled. Who was in the in vivo program, because I am a little confused by whether --

DR. MACIEVIC: Oh, as far as the type of worker --

CHAIRMAN GRIFFON: Whether it was all operations people --

(Simultaneous speaking.)

DR. MACIEVIC: That I don't have --

CHAIRMAN GRIFFON: I know we talked about --

MR. HINNEFELD: That would be

something to look at too, is what --

CHAIRMAN GRIFFON: Was that under the checklist thing, or is that a separate issue?

DR. MACIEVIC: Well, the checklist, we have talked about general bioassays in different facilities, but not throughout the workers that were, you know, targeted.

MR. HINNEFELD: That might be -- you're right -- that might be -- what put a person in vivo monitor, you know, why did they go to get an in vivo count? Was there -- it doesn't seem like --

CHAIRMAN GRIFFON: Was it all workers, was it a dose --

MR. HINNEFELD: Was it everybody at LAMPF did an in vivo once a year, or is it air samples and nose -- send people to in vivo, you know, that kind of question, what was the program.

MEMBER BEACH: What I'm wondering,

how many workers are we looking at? Because when I see '75, there's 17 whole body counts done. How many workers were actually there? That's a really small percentage I would imagine.

MR. HINNEFELD: A whole lot of workers --

MEMBER BEACH: Yes, that's --

(Simultaneous speaking.)

MEMBER BEACH: And that went on, there was one whole body count in '77, five in '78, these are your -- this is your table, '79 it jumps up to 42. It didn't really get up into the hundreds until '84 but that still seems like a relatively small percentage to me of workers, so that is a big question mark of who -- who was --

(Simultaneous speaking.)

MR. HINNEFELD: But what prompted them to get an in vivo count?

MEMBER LOCKEY: Can I ask you a

question about the filters, the stack filters? Are there particular filters that --

MR. HINNEFELD: I guess, I mean you can have a particular filter, you can have charcoal or --

MR. MILES: You know, what other combination of particular -- I mean vapor and charcoal --

MEMBER LOCKEY: How much vapor would get to those? The vapors would be pretty much particulates, I would suspect.

MR. HINNEFELD: Well, the vapor is kind of a designation of a -- it's a particle-size designation of a particulate, right? A vapor --

MEMBER LOCKEY: Can that be captured by the first?

MR. HINNEFELD: I don't know. I'd have to find out.

MEMBER LOCKEY: And how much of the gas would be absorbed on the particulates?

MR. HINNEFELD: Well, if it's a gas, the particulates won't absorb anything. The charcoal will absorb some gases.

MEMBER LOCKEY: How much -- but the gas will be absorbed onto particulates?

MR. HINNEFELD: Well, sort of yes, sort of no. But mainly the charcoal would absorb some of the noble gas, if it were a noble gas. And any other gases, I don't really know. I mean, if you're making nitrogen, you know, I don't know if anything is going to --

(Simultaneous speaking.)

MR. HINNEFELD: Nitrogen, that is what most of the air is, I think that's going to blow through. I don't know what the carbon would remain. If you are generating carbon-11, that's kind of, it's oddball; it's likely that it's going to be combined with oxygen and have CO or CO2, if there's -- you know, presumably it's oxygen --

(Simultaneous speaking.)

MR. HINNEFELD: Well, that, presumably, I don't think would be absorbed very much either, although I don't know what charcoal would do for CO or CO2. It might do something. I doubt it would do anything for nitrogen.

CHAIRMAN GRIFFON: The other thing I'm having trouble with, I mean, almost to try to save some work maybe for NIOSH, is you know, this hold up question. I mean it seems like it was documented that there was this document back and forth with EPA over the hold up times. But are you, unless -- does it mean, the hold up was negligible or there wasn't any hold up, when you are doing your emissions research?

So how does that jibe with these -- this sort of --

MR. MILES: I think we reached that conclusion because there were so many very

short-lived nuclides among the data that we looked at, so we -- we made the leap to -- and since there's so many very short-lived nuclides on there, that there couldn't have been a significant hold up prior --

CHAIRMAN GRIFFON: Then what was this argument about back and worth with the EPA, about hold up?

MEMBER MUNN: Well, EPA would care but, but that --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: No, I mean it seems to me like it was a practice, if both sides were agreeing, they were just, they were just fighting over the time.

LANL was arguing that it was a longer hold up time and therefore the emissions to the environment would be less, and EPA was arguing no, we think it was -- or it was shorter, so the environmental emissions would be greater. You are saying there was no

hold up.

DR. MACIEVIC: Or not significant.

CHAIRMAN GRIFFON: Or not significant. I mean, something is not right.

MR. MILES: Yes, but I don't know, I don't know if it's looking at the -- if the EPA was looking at the same set of data, or you know --

CHAIRMAN GRIFFON: Because I mean, that's a fundamental problem, just in your method that you are proposing, if you can't use, you know, if you don't know if there's hold up issues, that doesn't jibe and that creates a fundamental --

MR. HINNEFELD: Yes, but it's kind of the same thing I was talking about, if we are measuring activity on a filter, what does that really tell you about the airborne concentration that --

CHAIRMAN GRIFFON: Right.

MR. HINNEFELD: Existed in the

workplace?

CHAIRMAN GRIFFON: Right.

MR. HINNEFELD: Does it -- it's the same thing? How long is it, you know, it could be a -- part of the hold up is just getting it to the filter, you know, the time it takes for your exhaust to pull through your system to get to your filter, kind of how much run you have.

If you've got half lives of --

CHAIRMAN GRIFFON: I got a sense from the summary of those documents, though, that it was, that they sort of planned hold up --

MR. HINNEFELD: You've read more than I have, certainly.

CHAIRMAN GRIFFON: Well I mean, probably this is summaries, maybe, you know, but I -- I mean, I guess I would ask that first, because if you can't answer that, I'm not sure you should go forward with the rest

of it. I mean, I think it's --

MR. HINNEFELD: Yes.

CHAIRMAN GRIFFON: You know. I don't know if you are ever going to make a convincing argument you are assuming no hold up when there's documents out here -- it's the petitioners raised the EPA document, in their references. I think we need to answer that question.

MR. HINNEFELD: Well that is true, if there's now way to resolve the question of how does the activity on the filter relate to the activity in the workplace?

CHAIRMAN GRIFFON: If there is no way to resolve that question, which is the question of hold up, then I don't know where you go with that.

DR. MAURO: This is John Mauro. I have a question regarding this effluent monitor system. In my experience, there are two different ways in which you sort of keep

an eye on what's leaving the plant.

You have a filter paper, let's say we are talking particulates, that's offline, that is used -- it's going up a stack; and you've got an isokinetic sampler that's drawing from the stack, sending the air flow, sampled air flow, representative air flow, though a filter paper.

And there's a sodium iodide detector sitting right next to it, generating a continuous spectrum of -- you are continually running a strip chart of what you are looking at. It could be isotopics, or it could be gross.

The other way is no. You allow the air to flow -- sample to flow through a filter paper that accumulates the particulates over let's say a week, and you pull the filter paper off and you do a gamma-spec or whatever you want to do on it.

In the first case, you are looking

at actual, real-time releases. In the second case you are looking at an integrated, where the short-lived are going to go away.

And this is the point that I believe Stu is making. So the ability to use, in some capacity, the effluent measurements, and I assume that they are upstream from the HEPA filter, in other words, to get your mix, I guess that's where I'm heading, I understand you want to use the effluent material to get a mix that somehow keys back to beryllium, and I think your ability to do that will somewhat depend on whether or not you are looking at a continuous monitoring flow or you are looking at an integrator, which is a sample.

Do you know which type of data you are getting from your effluent monitoring?

MR. MILES: Unfortunately I think Liz is the best -- for this question. She compiled the data and kind of developed this methodology so she would know more about it.

MR. HINNEFELD: I think a description of -- the -- I think a description of the -- of what the sampling technique was like --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: It's obviously another --

MR. HINNEFELD: Yes, with real time monitoring you would also --

(Simultaneous speaking.)

MR. HINNEFELD: Filter which is another complication.

CHAIRMAN GRIFFON: I mean I think -- yes, you said that and John, you enforced it, that all this sort of hinges on what was the method, what was the type of monitoring you were doing, what was the protocol.

MR. FITZGERALD: I think the original notion of last meeting was, and I think you even said this earlier, there had to have been some areas of air samples, you

mentioned all these surveys, that all gross alpha beta, I guess I would be surprised, because you would want to know, you know, what you are dealing with in the workplace that --

MR. MILES: That's all we were able to find. I mean --

MR. FITZGERALD: Okay, because --

MR. MILES: I mean, I found gross alpha beta but it's going to find -- not that it doesn't exist, there could be a big stash of it somewhere, but --

DR. MACIEVIC: Well, you are talking gamma spec samples so --

MR. MILES: We didn't come across any --

(Simultaneous speaking.)

MR. MILES: monitoring data.

MR. FITZGERALD: Because the further away you get from the workplace off the stack, and you get the kind of questions that John is asking, which is how can you, you

know, take care of all these variables and make sure that this is reflective, and I think it gets to be quite a challenge.

CHAIRMAN GRIFFON: Yes, I think that's why our last meeting, we focused on workplace sampling.

MR. FITZGERALD: Right. Right. But I guess --

MR. MILES: But it's clear that they used the workplace sampling to, you know, and they had these cameras going up -- there were a lot of boxes of -- they generally follow up with nose smears, you know, for a person with nose smears, so I'd like to think that, you know, if that could be an indicator to send somebody to the whole body count --

CHAIRMAN GRIFFON: Maybe, yes.

MR. MILES: But then again the question is whether or not we are seeing all the radionuclides in the whole body count, so that's where I think Liz, who put together the

whole -- they used the common beryllium-7 and look at some ratios so that we can add some nuclides that maybe we are not seeing with the whole body count, if we missed, you know, if they didn't show up, maybe they were --

DR. MACIEVIC: Which would then increase the dose.

MR. MILES: To bring them back into -- the assay contributors, to the dose --

CHAIRMAN GRIFFON: I propose we take a little break and come back and try to summarize where we are in the MAP and go forward, what actions are on the table. Okay.

(Whereupon, the meeting went off the record at 10:32 a.m. and went back on the record at 10:52 a.m.)

MR. KATZ: Okay. We're back, the LANL Work Group. Go ahead Mark.

CHAIRMAN GRIFFON: Okay, everyone on the phone, we are, you know, we are back a few minutes late on our break but wanted to

sort out just a little bit more on the path forward on the MAP issue.

And here's what I have got as a summary, if everybody else, just give it a try, and I ran it by Stu and Joe so hopefully this is close.

Essentially it's NIOSH to provide a model for using beryllium-7 in vivo data for the MAP exposures and then I have all these sub-bullets which are the meat of how you are going to do that.

And A is the rationale for the ratios and showing -- and demonstrating that that rationale will be bounding for all MAPs. The second one is the monitoring, the last issue we were just discussing, the emission monitoring, what technique was used and how does that impact on your, you know, kept looking at the ratios.

Third is the criteria for inclusion of the in vivo program, who was monitored and

why, was it triggered by those waves, was it all workers, what was the criteria.

Fourth is the question on hold up, which you know, I think to some extent overlaps with the rationale on the ratios and the monitoring but I just wanted to list it out separately, the hold up question.

And the thing I am still struggling with is -- which, which is that it was reported in the, sort of this dispute between the EPA and you know, so there -- that has to be dealt with somehow.

Five is the -- maybe this should have been one -- but five is the availability and sufficiency of the beryllium-7 data itself. I think that came up in some of -- Josie raised it with looking at the table, maybe in those early years, '75/6/7 there seemed to be very, very little data, even on beryllium-7, even those data that you have.

And then the last one is other

workplace data, if applicable, because I'm not sure, you know, the badging stuff was mentioned and maybe it's just to demonstrate, you know --

DR. MACIEVIC: Yes, we're not going to use that --

CHAIRMAN GRIFFON: Right.

DR. MACIEVIC: as a --

CHAIRMAN GRIFFON: It might just support your argument that these doses were low and we can bound them or whatever. I don't know, you know, but, so that's just sort of the last -- did I miss anything, anyone?

DR. MACIEVIC: I think you got --

(Simultaneous speaking.)

MEMBER BEACH: who was the whole body -- okay.

CHAIRMAN GRIFFON: Yes.

MR. HINNEFELD: Yes, and I kind of wonder if that's --

(Simultaneous speaking.)

MR. HINNEFELD: when the numbers in vivo go down, kind of things have changed.

CHAIRMAN GRIFFON: Yes. Who, and did it change over time I guess would be a good addition to that.

MR. HINNEFELD: Yes. Yes. It might be good to see what you could find out about that back like in '79 there was sort of a quantum --

CHAIRMAN GRIFFON: Yes.

MR. HINNEFELD: take a number of whole body counts and I just wonder if something changed in 1975.

CHAIRMAN GRIFFON: Was it something operational or was it a change in procedure --

MEMBER MUNN: I thought it was operational, just looking at the data. It looked like, yes --

DR. MAURO: Mark, this is John. I think there's one item that we didn't talk about, real quick. When you are looking at

effluent data, usually the effluent going up the stack is headered for many different locations within the building.

So what you are really looking at when you header everything together is a time integrated average. Is there reason to believe there could be variability not only in time, but also in location, if you know -- so that, you know, your mix could be very different in one location --

CHAIRMAN GRIFFON: Local work stations versus the -- yes. Yes.

DR. MAURO: Exactly. That was the, that was the point I wanted to make.

MR. FITZGERALD: You have four stacks at LAMPF and they drew from different parts of the building, target areas, and you have to integrate across the --

MR. HINNEFELD: Did you have four stacks before you had four target areas?

MR. FITZGERALD: Well no, you just

had different locations --

MR. HINNEFELD: Different target areas.

MR. FITZGERALD: It's laid out pretty much in the documentation --

MR. HINNEFELD: Okay, all right.

MR. FITZGERALD: What fed those stacks.

MR. HINNEFELD: Okay.

MR. FITZGERALD: That would be important I think, what John's saying, making sure that's integrated, that you are not just using one stack, not using all four.

MR. HINNEFELD: Right, no.

MR. FITZGERALD: Yes. Yes.

CHAIRMAN GRIFFON: Okay. Thanks John. All right, so I think we should leave it at that on the MAP. I don't know if there's anything else --

MR. FITZGERALD: No, I think --

CHAIRMAN GRIFFON: To discuss on

that -- yes.

MR. FITZGERALD: I think you summed it up. I think it's documenting the model and validating applicability.

CHAIRMAN GRIFFON: Right. All right. And then you want to go on to the fission products --

MR. FITZGERALD: Mixed fission products. Right. On mixed fission products, which is sort of part of issue 1, I think we numbered it 1D, our concern was about the use of the reactor ratios, as I said earlier, in the OTIB, for a non-reactor facility.

And I think at the last meeting, NIOSH agreed and was going to do onsite data capture to see if there was in fact any data that might in fact be a basis for looking at ratios at these non-reactor nuclear facilities like TA-48 and I think CMR are the two biggies.

And I think the response was no. I

guess you couldn't locate any mixed fission product data or any substantive nuclides that --

MR. MILES: We looked for similar data like what we found for LAMPF, like stacks -- isotopic and I think we didn't find a whole lot, and I think we also concluded that the facilities were complex and that you would have one thing going on in one laboratory and something different going on in another laboratory so you've got to try to place people in different areas, and that was kind of going to be a hard thing to do. But we weren't able to find the data, I mean a lot of isotopic data that's similar to what we had used for the LAMPF model.

MR. FITZGERALD: Now, as you did with LAMPF, I noticed one thing, going and looking at the emissions data, facility-specific emissions data for Los Alamos, really looking at the MAP issue, the activation, I

also noticed that they detailed monitoring of mixed fission products, certain stacks of TA-48 and CMR, TA-3, they actually had mixed fission product emissions data for those stacks, which sort of reminds me of LAMPF in a way, that you know, here we are actually detailing, you know, emissions of specific nuclides and mixed fission products, but we don't have any occupational workplace data.

I don't know if you looked at the stack data to see if there was anything that would, you know, shed a light, shed light on --

DR. MACIEVIC: No, nothing that you could get your hands around and make some kind of model for, but one of the reasons that we are -- in the case of looking at several RWPs from these different areas, RWPs from the CMR and that, and scheduling of bioassays and things for things like cesium and others for the fission product, there is data on that.

So there was a distinct program on scheduling for, if someone was involved in CMR with cesium-137, they were scheduled and I sent them to have examples of that, of that type of RWP, and also the scheduling program of how they would put persons on from another facility coming in, saying if they are going into CMR do this, they move on to the cesium-137 monitoring program for bioassay.

So we are saying that instead of having something dealing with, like at LAMPF, that you have more bioassay associated with that facility.

MR. FITZGERALD: I guess, you know, I went through all these CMR documents -- that took a while -- and you know, I see the RWPs or SWPs as they call them, they list, you know, mixed fission products in some cases and cesium along with -- as one of the primaries. In fact a lot of times it's PU, plutonium, uranium, and then you know mixed fission

products.

And you know, you can find it mentioned in programmatic documents, whether it's surveys or whatever, but I just can't get past the point that it doesn't look like they were -- there was any evidence they actually bioassayed for it, and I --

DR. MACIEVIC: Well, they bioassayed and gamma speced the bioassay, which you -- in looking at 1E, issue 1E, has the listing of the scheduled bioassays versus the bioassays that were left through that period for new hires, transfers --

MR. FITZGERALD: 1E was the checklist.

DR. MACIEVIC: 1E is the checklist. 1E is the checklist. And on that, you do see, and I had highlighted, the T-48, T-50 and T-3 with CMR, that the bioassays, there are several things for mixed activation products, a column for mixed fission products as well,

and bioassays were left in there.

In some cases, they said mixed activation product is what the bioassay sample was left for, and it says they wanted a mixed fission product, but since you are doing a gamma scan of the sample, they, I assume, covered that in that. That is how that was looked at, since these are gamma specs.

MR. FITZGERALD: Now, the issue -- well, we are flipping a little forward on the checklist --

DR. MACIEVIC: I know, but it sort of falls into this because you are talking about how they looked for the mixed fission products in CMR and facilities like that, as opposed to using air data.

MR. FITZGERALD: Now, without -- well, maybe we are, on the checklist, we, you know, I think our concern, when the checklists were raised, because the chekclists came into being -- everything seemed to have happened in

the '70s. The checklist came up in the '70s. So our concern was, you know, were they truly a driver for bioassays or for want of a better word a secondary radiation source, not the plutonium, the tritium and the uranium, but you know, for exotics, for mixed activation, mixed fission products as well as the primaries, the plutonium and whatnot.

And we weren't sure about that. And I think --

DR. MACIEVIC: Well, we didn't intend it to be, I mean it's not -- we're not trying to say that once they put in the health physics checklist, I mean, if -- that this is now the be all and end all program, because you also have the whole body counts ramping up in the '70s, you have a checklist program which now, at least, shows that the program is trying to identify when a person moves into a new job or switches to a new job --

MR. FITZGERALD: Right.

DR. MACIEVIC: Where they need dosimetry, that they have something in place that is at least trying to focus on those issues, and of course, to go and say we are in now way trying to say that this is the be all and end all --

MR. FITZGERALD: No, no --

DR. MACIEVIC: And that it covers all activities or someone didn't fall through the holes --

MR. FITZGERALD: Right, I mean --

DR. MACIEVIC: but that you have a little more structured program now in the '70s than you did in the earlier years, and it moves on through the later years.

MR. FITZGERALD: And I grant you that. I think in the '70s you have this evolution of not only the whole body counter coming into play, and you know, you're getting more people monitored, you're also getting a little bit more of the radiological control

program, you know, where you're -- you know, you have these checklists that are being introduced and you know, they are being applied.

So no question that, you know, the Los Alamos health physics program was evolving, as it did even before the '70s, and as it would past the '70s, you know.

So what we are really trying to figure out, less, you know, trying to, you know, anoint the program as having arrived at any particular point in time, is just trying to figure out, you know, is there a method? This is sort of beginning to sound a little bit of an echo from the MAP discussion. Is there a method to get to mixed fission products, because that was part of the basis for cutting it off in '75.

So we are looking for that method. Now, the cesium-137 didn't work because this is not a reactor facility. So the plan B was

to see if there was any data for mixed fission products, that you know, actual monitoring data could be applied to any method. I mean you know, not necessarily ratio method, but any method.

And your response, and I've read it a few times, it kind of suggests that no, we didn't find it, and --

DR. MACIEVIC: Although I said we didn't find the exotics, as far as the actinides go. You do not see actinides really mentioned in the checklists in all the --

MR. FITZGERALD: Well, I'll have to --

(Simultaneous speaking.)

DR. MACIEVIC: Mixed activation and mixed fission are definitely on the checklist and there are samples left in bioassay through '77, '78, through the checklist that we had, the large checklist section, they are mentioned there, as things to go to.

MR. FITZGERALD: Yes, let me just find the response, because I --

DR. MACIEVIC: You're not going to find curium, neptunium --

MR. FITZGERALD: Yes.

DR. MACIEVIC: On there because you won't even find that today, essentially, on the --

(Simultaneous speaking.)

DR. MACIEVIC: Work permits, so there.

MR. FITZGERALD: Okay, so basically you are saying NIOSH agrees that the MFP ratios from OTIB-54 were not applied in non-reactor facilities in cases where fission products may have been separated.

NIOSH has not been able to locate sufficient data to determine nuclide ratios applicable to other facilities such as CMR, where work campaigns have all separated fission products, for example strontium-90 may

have occurred.

And then finally you say NIOSH has, however, found a tremendous amount of RWPs, workplace monitoring and nasal smear data through the applicable time period for locations such as CMR, and has evidence that appropriate bioassay methods were generally available.

You know, I read that and what came to mind was program reliability, that the program was a sound program and would have, in fact, applied appropriate bioassay methods, if in fact there were exposures to mixed fission products. Now --

DR. MACIEVIC: While having someone on an RWP, say, you are now going to need a cesium bioassay and you have a program from the bioassay group saying, oh, put 'identifying information redacted'. over onto the cesium-137 program for CMR, would to me suggest that they were looking at that issue.

Now, to say whether all people were all monitored exactly and picked up on everyone I can't say.

MR. FITZGERALD: Well, what we want to know -- I think what we want to know, though, is that for strontium-90, cesium, these mixed fission products, were data being collected such that you have enough of that data to bound the doses for these facilities.

DR. MACIEVIC: Well, but we are not using the bioassay data there to bound. I mean, we are -- a person left a bioassay sample and if he has a dose reconstruction, that bioassay data is going to be sent over by DOE and you will have bioassay data.

So it's not like we are trying to take something from the checklist and say these 40 samples from '77 will be used as a basis to say all workers have been, you know, are bounded by that number.

We are saying that if a person was

involved in the cesium-137 they would have left a bioassay sample which now, a dose reconstruction can be done using the bioassay data that will be in the database for the -- which is where we got the checklist responses on the checklist sheet, from the bioassay database, saying a bioassay sample was left.

So I --

MR. FITZGERALD: You have enough data over the mixed fission products involved with CMR to do dose reconstruction.

DR. MACIEVIC: See, are we --

CHAIRMAN GRIFFON: Are you saying you only assigned -- saying you only assigned mixed fission product dose to those who were -- who have it in their individual records?

DR. MACIEVIC: Right. That they did have a --

CHAIRMAN GRIFFON: So there's no model --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: For a coworker approach --

DR. MACIEVIC: No, exactly.

CHAIRMAN GRIFFON: So you are saying they monitored everyone they should have --

DR. MACIEVIC: Right and that will be the question --

CHAIRMAN GRIFFON: Take it on the --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: Program that they monitored everyone they should have, and therefore it will be in their individual records.

(Simultaneous speaking.)

DR. MACIEVIC: That there is a bioassay program for it and that the bioassay sample would be there, right. So --

CHAIRMAN GRIFFON: I just feel like --

(Simultaneous speaking.)

MR. FITZGERALD: I'm just saying that looking at the documents, I mean, you sort of -- you point everybody to the SRDB file and you know, I went through as many as I could stand, like --

DR. MACIEVIC: It's a question that --

(Simultaneous speaking.)

MR. FITZGERALD: Somehow, basing dose reconstructability on a literature survey that points to you know -- if we were to do a keyword search for mixed fission products, and you know, I would expect to have RWPs and SOPs and surveys pop out. But does that, you know, does that represent an adequate monitoring program that you can base, you know, you can accept the bioassays that were done as reflective of those who must have been exposed.

I mean, that's pretty indirect,

given the cutoff that was imposed. I mean, it's going to program reliability in a large sense, starting in '75. And I'm not so sure that you didn't have that before '75. I mean the issue was there wasn't any method before the whole body counter showed up and now the whole body counter is available, does that give you enough data to do a distribution and come up with confidence that you have an upper bound for CMR, TA-48, all these facilities handling mixed fission products.

And I don't see very much, other than this, you know, be assured we have RWPs and we have documentation that mentions --

DR. MACIEVIC: But it doesn't mention there's actually sampling there. So what you are saying is, is that all the bioassay samples that are there are not all that there should be. There should have been a whole bunch more that were missed. But how do you --

MR. FITZGERALD: I would start with the source terms in CMR, TA-48 and say we got strontium-90, we got cesium-137, whatever is the source term, say do we have bioassays that correspond to do those source terms.

DR. MACIEVIC: But we do --

CHAIRMAN GRIFFON: But do we have an inventory --

(Simultaneous speaking.)

MR. FITZGERALD: All I have is a qualitative response that says we have a number of documents on the SRDB that supports this and I have looked at them, and you know, I, you know, neither here nor there, they do mention mixed fission products but I don't have any assurance that I can go from column left, which is the sources in these facilities historically, and starting in '75 I can see clear evidence that there's a -- there's bioassay records being generated that you can use.

That's the only thing that, you know, quite apart from coming up with a method, ratio or anything else, I mean, that's kind of basic stuff.

DR. MACIEVIC: Yes, but that's what the checklist was supposed to show, and that it is showing, for the particular nuclides under the mixed fission and the mixed activation, that were requested by of course a specific group of people, which is like I said, new hires and people beginning jobs, but --

MR. FITZGERALD: It's a small segment of the worker population.

DR. MACIEVIC: But then you also have, in the sample that I showed with the bioassay where you have a list of people being transferred into the cesium-137 program for CMR for bioassay.

So I mean, I agree, it's not everything that is there, but it's not that

it's just a procedure written by internal dosimetry saying yes, everybody should leave a sample now and then. You actually go to RWPs and SWPs that mention it, and then have actual bioassay samples from these facilities for those years.

So I mean, it's not, again --

MR. FITZGERALD: I haven't seen any of that data presented that way. But going back to the checklist, okay, the checklist first off, this is another, you know, item later on, and we might as well dive in, and first off, as you pointed out, it's limited to new hires, transfers, a film badge request, or a rehire.

Okay, those were the four categories that apply on the checklist, that's the population of workers. It's only people who are effectively arriving in an operation because they were just hired, they were just transferred in, or they were rehired, or they

want a badge.

So these are, these are, these are people entering the operation and they are trying to baseline them in terms of you know, what was their past radiological history. I mean, I got a sample right here, you know, what was your past exposure, stuff that you would expect, did you get an HP indoctrination, did you receive occupational radiation exposure at a site other than Los Alamos, you know, did you get an initial urinalysis kit issued, sort of baseline.

So some very basic, introductory things when you are bringing somebody new in. That's the checklist, okay? Now --

DR. MACIEVIC: And the spreadsheet?

MR. FITZGERALD: Yes, once there's a spreadsheet, once there's a spreadsheet and you know, we have had a dialogue on that over the past few weeks because I did go to this -- I actually have printouts right here. I

brought hard copy. And I went from the checklist, and yes, you do have mixed fission products, and mixed activation products checked here. And I went over to the right-hand side to see whether in fact these individuals were bioassayed and found that, you know, some were but some weren't and I think I even went back to you and said, I don't necessarily get the sense that it's one for one correspondence and I think your response was well, sometimes it takes more than just one check. It takes maybe a couple of checks --

DR. MACIEVIC: You may find a whole bunch of samples and see what you don't have, and where -- what the sample is, when you have got a person, because this is covering the two-year period, you've got a person coming in, whether a person stays immediately in that job when they come in and not get put on to something else that they get a bioassay for

plutonium instead of the cesium -- you don't know what the inbetweens happen to this person. You have got the statement up front when they are coming in, and then down the road you have these samples and I have not connected that to go and say this sample is definitely the sample that was requested on a particular check. That is not there. All we have done is gone through the bioassay to see are there bioassays for a particular person that had a checklist asking for some kind of sample.

Some don't even -- that will say none required, but then there will be a bunch of samples that were left during those periods of years too.

So that means other things are happening inbetween that it's not the bioassay we are using is just going into the bioassay database and putting them all in there to show you this is what was left by that person in

those two years.

Whether -- go ahead.

CHAIRMAN GRIFFON: I was just going to say, you guys are, I mean you have looked through this a lot more than I have. Does the checklist include, like you mentioned RWPs earlier, does it include workers that have, you know, been at the facility for five, six, seven -- not this coming in or as 'identifying information redacted'.was -- not this new hire --

DR. MACIEVIC: The checklist -- just the new people.

(Simultaneous speaking.)

CHAIRMAN GRIFFON: there are some people that might show up on RWP --

DR. MACIEVIC: Those are the general workers that are in the job all the time, so you could get that person who was on the checklist for one bioassay could also be on an SWP or an RWP that requires them to have

other bioassays --

CHAIRMAN GRIFFON: You say requires them to have, did you connect that dot in any way? Did you, did you find out whether, like, a subset of these RWPs that identified -- do they, I assume they have names?

DR. MACIEVIC: Well we have '77 and '78, but then you've got -- you've got a --

CHAIRMAN GRIFFON: Yes, did you link those or --

DR. MACIEVIC: No. Not linking it in that to go to the RWP, to go and say okay, these are from the RWPs, these are from the checklist. That part has not been done. So yes, you can say there is a hole because you have samples left, checklist, and you can't say okay, that sample is from that RWP and that sample is definitely from the checklist requirement. That is not there. You won't be able to pull that up.

CHAIRMAN GRIFFON: Because I mean I

think it was a strong part of your basis, is that a tight RWP system and if there were a sample then they have data in their individual file.

So it seems like we need to, to some extent, validate that. I know pulling all, you know --

MR. FITZGERALD: Well, there's two facets to that. One, of course, is, I think RWPs, it's evidence that on a job basis, somebody is thinking about mixed fission products, and now those are capabilities that actually do account, whereas before it was not.

So certainly you would want to see if MFPs are being culled out and whether in fact the count is being done.

And the second thing is, is whether or not workers that were routinely exposed, which is a tough one, routinely exposed to mixed fission products, not just plutonium or

uranium at the CMR and places like that, but you know, mixed fission products, whether, you know, there was a kind of a routine program to look at the dose component from MFPs or not.

And I, you know, you haven't seen any data, so you know, the question is, is there any way to, you know, find out, did the facility, did CMR actually address the dose from mixed fission products, and how would they know how to do that, or how did they do that?

It's sort of basic. I don't, you know, again I understand the checklist. I understand the RWPs. They are indicators that the program was conscious of MFPs.

But I went back and looked at the data, you know, it was the same kind of documents back in the '60s, late '60s, into the early '70s, you know, before '75, and they were aware of MFPs back then too, I mean they were cited in the operational documents.

So I tried to look at the health physics, the health physics in quarterly documents as well as the operational documents before '75, looked at the ones after '75, and quite frankly there isn't much difference in terms of an acknowledgment that they knew they had mixed fission products.

What we are really trying to distinguish, though, is whether or not the personnel monitoring began to happen in '75 whereas before '75 there wasn't attention paid to that, such that you were going to get generated the kind of data that would be useful for dose reconstruction with sufficient accuracy.

So you know, that's the part that you know, I have no doubt that they were aware of and conscious of MFPs, and in fact they were aware of and conscious of --

(Simultaneous speaking.)

MR. FITZGERALD: But

programmatically, you know, in the '70s, I don't see a whole lot of difference on that score. What I'm trying to --

MR. MILES: What if you take that '70s and extend it out to the 2005.

MR. FITZGERALD: Yes.

MR. MILES: Do you see a difference there?

MR. FITZGERALD: That's a question we have been asking ourselves.

MR. MILES: Our 2011 is --

DR. MACIEVIC: Now you're talking --

(Simultaneous speaking.)

MR. MILES: Strontium-90 bioassay data, say in 2011, or --

MR. FITZGERALD: How -- but that's a good question.

DR. MACIEVIC: We have not seen that.

MR. FITZGERALD: But for mixed

activation and mixed fission products, it's a fair question.

DR. MACIEVIC: Well, also on the other exotics, for the actinides. They are not there either until later that they are mentioned and a program is in place for curium, neptunium and all that where you are -- and that's the whole point of our developing the scenario we did, because even to present day, in talking with people and looking, you are not going to find LANL saying oh yes, now we have an actinide, I mean, they admit they have the actinides program but you are not going to find actinide bioassay, which is going to say these samples were left for this, this, this and this. They haven't split it out like that. They are still doing it with plutonium, uranium and running it on that kind of program.

But to now look at 10 CFR 835 and that is saying they are intentionally ignoring

stuff they know is there and they are not computing dose.

So now you are getting into legal questions and you get past the 10 CFR 835 --

MR. HINNEFELD: Somewhere, somewhere, though, around the early '90s, Los Alamos should have written up an internal --

CHAIRMAN GRIFFON: That's what I was just going to say, a Technical Basis Document.

MR. HINNEFELD: Technical Basis Document, right, that described it as part of the compliance with 10 CFR 835 and it's a Technical Basis Document different than what we use the term for, our programs.

And they should be describing, in that document, this is who we monitor and why and how we can -- how we are verifying that people are not exposed to more than 100 millirem a year without being monitored.

Or, if there is a technology

shortfall, this is -- we'll monitor them as well as we can, but we are going to miss 100 millirem, you know, that's what that's going to say.

And we aren't going to be able to see 100 millirem, but we are going to do the best we can and our missed dose is going to be a rem or 500 millirem or something like that.

So somewhere around then, they should have written that, and that should be describing what they are doing today that is compliant.

And then maybe they didn't change anything --

CHAIRMAN GRIFFON: I can't imagine that doesn't exist.

MR. HINNEFELD: I can't imagine. They could --

DR. MACIEVIC: No, it does exist. I've got to remember whether or not they mentioned -- we haven't -- talking to current

day staff, though, in this -- they --

CHAIRMAN GRIFFON: But they had --

DR. MACIEVIC: They don't have technology --

CHAIRMAN GRIFFON: But they had to develop a rationale for why they could rely on plutonium.

DR. MACIEVIC: Right, and it really is the rationale we are talking about and that the -- go ahead.

MR. HINNEFELD: So then the other, you know, then the extension of that question though, that I think is relevant here, is did anything change at Los Alamos when they wrote that, that means that okay, we haven't done this up to now, but now we are going to, or were they just, or were they just saying this is what we have been doing all along or how was it written, I don't know if there's any way you can infer that or not.

But the fact of the matter is,

there should be something written by Los Alamos in the early '90s that said this is how we are complying with 835's internal monitoring requirements.

And if that, and you know, so to me, that tells you, that needs to tell you something about selection, because what we are getting into here, is where the right people, were all the people who should have been monitored, monitored. Yes, because yes, there are RWPs and it's going to be a fool's errand to go back and find -- are there names associated with RWPs that --

DR. MACIEVIC: Yes. Yes.

MR. HINNEFELD: Okay.

DR. MACIEVIC: Some were for specific jobs, so you may not have the -- it may be a general RWP and so --

(Simultaneous speaking.)

DR. MACIEVIC: Right.

MR. HINNEFELD: Okay. So, but

there will be, so it will be a general RWP which may give bioassay requirements?

DR. MACIEVIC: Right.

MR. HINNEFELD: And so you won't have a set of names there, so you can't go verify that everybody worked on that general RWP got the bioassay required by that RWP.

But our position here is that people who worked on the RWPs did have it, did have the bioassay, and that is why their dose reconstruction is going to have this, is going to have -- going to use their bioassay and we are not going to worry about coworkers or anything like that, because people who should have been monitored, were monitored.

That's a long pole unless you've got something that shows that there is a program and this is how the program worked and this is how it worked in 1992 and this is how it worked in 1995, that caught everybody.

And I'm interested, you know,

Andrew is sitting there and hasn't said anything. I know that security officers must have gone in CMR.

MR. EVASKOVICH: Okay. Yes, let me -- RWPs, let me throw a current issue out and building 102 with the new machine in there, this is going on right now. So if it is going on now I think that you can assume it was going on during the time frame of the petition.

I was supposed to patrol in the building 102 and they put a new sign up right there that went across the line into the area that said if you haven't signed the RWP, you are not allowed into this area.

And it had been dated months prior and apparently had been -- this had been going, that was the first time I had seen it. That was the first time they had put it there.

So as far as RWPs go, the way it came out and if the worker had used 2009 --

DR. MACIEVIC: 2009, yes.

MR. EVASKOVICH: Ours said we don't see RWPs. We don't sign them, we don't see them, in that regard, nothing going on, those guards that are saying that it had been there for almost 40 years. Additionally, the other workers, the craftspeople said well, some of them said, you know, I have never seen an RWP and others have said well, you won't start seeing them until after the Tiger Teams.

So I think -- and initially the reports that I cited in the document that I sent, you know, there were issues with the RWPs and the SWPs as far as how they prepare them and whether or not they are accurate to, you know, place them -- or there are issues with them, there are problems with them, so you know, I question that. I -- ever since this issue came up with them, they always started looking at this last year, and I would think that within this time frame, that would

have been resolved by now, but it hasn't been.

DR. MACIEVIC: Well see, we are -- our bounding method for the actinides and the uranium, plutonium and all the other actinides going in there, is that methodology we talked about, plutonium intakes based on bioassay and then assigning highest actinide to an unmonitored worker would be like a guard or somebody walking into the place that has not been on RWPs, been in a facility that may have had this material and they get assigned that dose.

So that is, for these radionuclides, the methodology that we are going to use to give them a dose to say here's, at a, whatever percentile we want to use on that bioassay, intake and give them that dose.

So if he is not on the RWP but there is a particular -- if there are radionuclides where this activity may have

been present, and it's, you know, stated we are using it in the dose reconstruction process -- it's not right yet because we haven't finished discussing this through the Work Group -- but that is who -- how they are going to get it. For plutonium, uranium, tritium, they get the assigned dose based on any monitoring that was done -- that's the monitoring data that's there.

If you are unmonitored, then you get the doses that are stated in TBD as a missed worker, missed dose for a worker in that -- as stated in our TBD for internal and external.

But for unmonitored, for the actinides, and that -- those other, they get the TIB-62 coworker dose.

MR. FITZGERALD: But here's the question for you. You could have done that back in the '60s, I mean, what -- the difference -- you are saying you can use this

-- the actinide data, but you had the actinide data before '75.

This question of what difference dose the whole body counter give you in terms of actual in vivo analyses for mixed fission products, that gets lost in this thing, and what's just the whole basis for the cutoff period, and that --

DR. MACIEVIC: Well, the basis for the cutoff period was we used the 1975, just that was the date of the petition. We talked about the early '70s, yes, over the --

(Simultaneous speaking.)

DR. MACIEVIC: and we did not have this method yet developed when we -- we did not have it when we were looking at the first SEC as a possibility. We had no other data in there. What we found for the actinides, we didn't have a model that was there, and we went with the cutoff date, saying that that was the cutoff date, of 1975, for the end of

the proclaimed SEC.

Now, after that, when we started SEC-109, we started looking at the data saying, well, how do we get around, because we are not seeing this actinide data anywhere through.

So you either are going to have an SEC or you have to have some kind of a model to bound the dose assigned to the workers of this Class, for unmonitored workers, a particular dose.

And that's when the model got developed, so it comes after the fact. This model was not sitting there when we were doing -- so the model, I just told you, is the model for taking --

MR. FITZGERALD: Using actinide data.

DR. MACIEVIC: Using the actinide data, in thousands of plutonium bioassay from bioassay samples, you take the intakes that

are developed from that, and then say it's not plutonium, it's any one of these actinides. You get the highest dose from whatever actinide it is, and you say that's the dose we are going to give.

Nobody has addressed that yet and come back as to why that model doesn't work, as a bounding dose or a dose given to unmonitored workers for this Class, and nobody has addressed that yet.

I mean we have been talking about survey data and looking at --

(Simultaneous speaking.)

MR. HINNEFELD: What are we doing for unmonitored workers, for --

MR. FITZGERALD: Yes, you haven't proposed this model in your response. You just basically say that you couldn't find any data that would enable you to do a ratio -- and then you turn around and say that there is RWPs in other documents with site -- site

mixed fission products which gives you confidence that the program would have done the right thing.

That's pretty much what the response is. It's all we can really act on. Now you are really positing that you can use, you can use the --

DR. MACIEVIC: No, this ER -- well the ER goes back and says mixed fission products and exotic radionuclides, mixed fission products, mixed activation products and exotics, the exotics are what's being covered by this unmonitored worker, this is in the ER, stated back in the ER as laid out.

CHAIRMAN GRIFFON: But tell us how you are going to do the mixed fission products. That's all we are asking.

DR. MACIEVIC: The mixed fission products, we are going to be relying now on the bioassay data, gamma spec for the cesium and the specific strontium --

CHAIRMAN GRIFFON: Cesium in, the intake value for cesium for the range of radionuclides under cesium in the Evaluation Report, I can't remember all the range, take that intake rate, plug it in for each one of those, get the highest dose for the particular dose reconstruction you are doing and plug that in as all that particular radionuclide to get the bounding dose for that. That's the proposed method in the Evaluation Report.

CHAIRMAN GRIFFON: And it's only if you have just mixed fission product, a cesium record in your bioassay record, right, or no? Or is this for unmonitored workers as well?

MR. STEMPFLEY: Unmonitored.

CHAIRMAN GRIFFON: Okay, okay. I didn't understand that.

DR. MACIEVIC: Yes, it's unmonitored.

MR. FITZGERALD: Now, just to clarify one thing though. I think we had gone

through and you were referring to the ER language about using cesium-137 as a substitute, and this is not the OTIB-54 though.

MR. STEMPFLEY: No, this is defined in the Evaluation Report.

MR. FITZGERALD: Well, OTIB-54 says you can apply that to mixed activation, mixed fission products --

MR. STEMPFLEY: Right, and that --

(Simultaneous speaking)

MR. STEMPFLEY: The original Evaluation Report said it for everything, mixed activation products and mixed fission products.

MR. FITZGERALD: Right.

MR. STEMPFLEY: In the discussion of the Evaluation Report, we identified, as we discussed earlier, mixed activation products needed a different key element, which was beryllium, that was proposed -- beryllium is

the proposed method for activation products.

MR. FITZGERALD: But we went further than that. We said it -- yes, we said that OTIB-54 was written in a reactor context that would not apply to non-reactor facilities, either because the ratios that we based this for in OTIB-54 would not apply to a CMR for example.

But that's not what you are proposing here. This is different than that language in the ER.

MR. STEMPFLEY: What we are proposing here for CMR.

MR. FITZGERALD: Yes, the cesium-137 as a substitute would not work for mixed activation products. It would not also work for non-reactor nuclear facilities such as CMR or TA-48.

MR. STEMPFLEY: Now, CMR, we looked at the values for CMR, we specifically broke that out as a different analysis, based on the

Working Group meeting. We came up with --

MR. MILES: We tried to come up -- I mentioned this before -- we tried to come up with some ratios like that, like what we had for LAMPF, for CMR. We were unable to do that.

So I think what we are seeing is, if, if, for those cases which we believe to be relatively rare just from what we have been able to review in the SRDB, that if, if there was requirements for -- if there was a need for individuals to be monitored for, say, strontium-90 or another fission product that may not be in that OTIB-54 mix, and in those ratios, that a program was in place that would have gotten those individuals to have bioassay.

We are -- I don't think we are proposing arbitrarily to assign every unmonitored worker some, some quantity of strontium-90 intake.

MR. FITZGERALD: No, but I think your comment that somehow this gets bound back to the language in the ER may not be correct, because I think the last Work Group meeting, and Jim Neton, who I think weighed in as well, OTIB-54, with the cesium-137 as the substitute, does not work for the non-reactor facilities in the proposed way that the ER has couched it.

MR. MILES: I think everybody agrees --

(Simultaneous speaking.)

MR. FITZGERALD: This is not -- this is not in the ER, this is just using cesium-137 as a, as a marker of sorts, without getting into --

DR. MACIEVIC: But in TIB-62 you do have -- TIB-62 does the coworker, it does have cesium in there as also a radionuclide to be used for, divorced from having to worry about ratios.

MR. FITZGERALD: Right.

DR. MACIEVIC: But as, based on a bioassay, to also apply to an unmonitored worker. I mean, just like you have --

MR. FITZGERALD: Right.

DR. MACIEVIC: Plutonium and the uranium in TIB-62 to go through the alpha emitters and the actinides, you have the cesium-137 also in there, because you had the question before, remember, about the number of samples that were used in the year and --

MR. FITZGERALD: Right.

DR. MACIEVIC: that was all in there too. So, and that's divorced from TIB-54. That's not using --

MR. FITZGERALD: Right, okay.

(Simultaneous speaking.)

MR. FITZGERALD: We settled that.

DR. MACIEVIC: Right.

MR. FITZGERALD: Now, so the question becomes, does the cesium-137 in that

mode work for these facilities such as CMR, in terms of both an event-driven, which is kind of an operational, RWPs, and a routine basis, or not.

You know, one thing that concerns me in terms of, I mentioned the stack emission data. And you have specific stacks out of TA-48 and CMR for which MFP is the principle isotope.

Clearly from these work areas, mixed fission products is the primary emission source from that facility. And you know, what constitutes the source term, the strontium-90, cesium-137, what else is there, and do you have any data for those facilities, which gets into the question, similar to MAPs, you have information for the operations that actually handle the MFPs, and this was the specific facilities, TA-48 and CMR, for which there were air emissions of mixed fission products monitored.

So you can actually kind of pinpoint where that was the primary nuclide coming out of those operations, and the question is, do you have corresponding, any corresponding data for workplace exposures to MFPs and monitoring for MFPs for those areas or not.

I don't know. From what I can see from here, it's not easy to correlate these areas to that kind of data, see that data.

DR. MAURO: This is John Mauro. A quick observation. The OTIB-54, the reason they have -- it certainly is for reactors and it's based on primary coolant sampling in different categories, and they have four different reactors.

And there's good reason to believe that the mix is going to be quite a bit different in the primary coolant, mainly because of the fuel, the chemistry burn up.

Now, but if you are asking a

question, well listen, let's say I know that there is fission going on. I don't know the venue here, what they were doing. Usually cesium is one that is going to show up pretty quickly because chemically, it just becomes available more readily.

Like, strontium-90, historically, just doesn't find its way into the primary coolant the way cesium does. But one could argue, and I'm almost trying to find the way to get a hook on this, that it's the fission yield.

In other words, the worst you really could have, given that, you know, notwithstanding iodine and other gases, let's just talk fission products not including iodine and noble gases and tritium, but you ask yourself the question, well what about strontium-90, cerium and the other relatively long-lived fission products, in general the cesium is going to be present and available

for exposure, preferentially. So if you only have cesium data and you were to say well, what's the worst assumption I could make, of a lot of these other fission products because they may have been present, but you didn't look at them, I'm assuming that's what's going on here, the yield and the burn up will tell you that.

In other words, if you have some information on, you know, what the campaign was, whether you had fissioning, just knowing the burn up, you're done.

You could probably get a handle on the maximum amount of other fission products that might have been present along with cesium.

So all I am doing is giving you a, yes you cannot use OTIB-54 because you are looking at a primary coolant in OTIB-54. Here you have a different setup.

I don't know what this experiment

was where you were getting fissioning. But in theory the fission yield and burn up should give you a hook related to this, and of course, with the noble gases and iodines, you know, that -- they have to be treated specially. I don't know if that helps any.

CHAIRMAN GRIFFON: I think that's a good point. Do you have the hook that John is referring to? Do you have a way to tie it to the, you know, the campaigns that were going on, I don't know.

DR. MACIEVIC: I don't know.

CHAIRMAN GRIFFON: Yes.

DR. MACIEVIC: No, not at this time, no we don't.

MR. FITZGERALD: You know, if you can tie monitoring data, even if it's cesium-137 or strontium-90, you know, some of the bad actors, with time and place, and this might be campaigns, then you have something harder than this overall general program reliability which

I think doesn't get us anywhere.

I think that demonstrates that not only do they have a program, but the program is actually moving toward monitoring for mixed fission products, and that you can show that the campaigns and the locations, that mixed fission products were handled at CMR and TA-48, TA-50 -- there's three of them -- what's happening.

I don't have any way to know that from looking at the documents that were cited as evidence. I have the SRDB numbers here. I've looked at them all, and yes, FMPs are mentioned and RWPs in some of these documents, but you know, I don't know if that resulted in a, you know, a sequence of bioassays for RWPs, or whether a campaign where they were actually working directly with mixed fission products resulted in a routine program or not. There is no way of knowing that.

DR. MACIEVIC: Well, you know how

ugly it's going to be to associate a particular campaign at a facility, to track that material, to go to CMR, then the official work permit associated with that material, and then the bioassays associated with that, to link that all the way back, my God --

CHAIRMAN GRIFFON: Let me step back one, because I am still trying to figure out what's exactly on the table. I mean, you mentioned that the kind of approach is the cesium even for unmonitored workers. I'm a little -- so how are you going to use the cesium -- what's the current approach? If you don't have the hook that Jim was talking about how do you use it? I just want to understand.

MR. STEMPFLEY: I think the method implied in the entire Evaluation Report for the main monitored radionuclides -- plutonium, uranium, cesium -- is to take comparable activities for those -- where those radionuclides were comparable, make sure the

activities were comparable and that is what we try to attempt to do in the Evaluation Report, relate activities to the main, monitored radionuclides, and then take those main monitored radionuclide values based on existing data, bioassay data.

CHAIRMAN GRIFFON: So you did -- just let me stop there -- when you say relate the activities to other unmonitored, in this case we are talking about the -- you are relating the cesium to the other fission products, so that's your hook. I mean, we can debate on whether it's a sharp hook or what, you know, but you know, you had some basis for that. I mean I am refreshing my memory too --

MR. STEMPFLEY: We are trying to relate to existing -- where there is bioassay data, a significant or sufficient amount of bioassay data for people that were monitored, we could use that TIB-62, the coworker model value to apply.

We don't take cesium and say all right, we are going to plug in cesium, we are actually taking the intake value for cesium --

CHAIRMAN GRIFFON: I understand --

MR. STEMPFLEY: And then do --

CHAIRMAN GRIFFON: But without the hook you are still --

MR. STEMPFLEY: That's right. And the hook is --

CHAIRMAN GRIFFON: We have got to trust that the hook is --

MR. STEMPFLEY: The attempt that --

CHAIRMAN GRIFFON: Reasonable, right?

MR. STEMPFLEY: Right. The exposure scenario, the type of material that you are dealing with and how it would be dispersed is similar, and that's -- that's what we are trying to do.

I mean, and the best effort that we had was for certain things, obviously

identifying activation products in non-reactor type facilities, it's not a problem with TIB-54, but -- or the Evaluation Report excluding that.

MR. FITZGERALD: We're talking about urinalyses data for the cesium.

MR. HINNEFELD: Actually the cesium coworker model, I'm just reading it, just based on in vivo counting.

MR. FITZGERALD: In vivo counting --

MR. HINNEFELD: Yes.

MR. FITZGERALD: Not urinalyses.

MR. HINNEFELD: The intake rate, unless it's different, because I am looking at the one that is posted on our website, it says coworker model.

MR. STEMPFLEY: Sixty-two.

MR. HINNEFELD: Yes. Yes. It says that the intake rate is generated from in vivo data and assuming the class F, I would keep it

in the other system.

MR. STEMPFLEY: Right.

MR. HINNEFELD: Class F solubility which will maximize the intake rate, when you are using in vivo data. Using that, and actually analyzing the data in five-year periods, because it's -- there are like 301 total in vivo counts, and then once you have an intake rate, so this would be -- the coworker, the intake rate for, for cesium, depending upon, you know, based upon the in vivo monitoring data.

And then, so what our approach is, I'm hearing you saying, is that we believe that people working on a general RWP or who were casually exposed, would be reflective, would be no worse than the people who were on the in vivo -- would not be exposed to anything higher than the people on the in vivo monitoring program.

It would be nice to know why people

were on the in vivo monitoring program when we make that argument, and that's part of what we were talking about earlier, is why were people on the in vivo monitoring program.

If that's the case, that the unmonitored population would be no more highly exposed than the monitored population, then this intake distribution would bound the intakes of the people who were not monitored.

CHAIRMAN GRIFFON: Are we also assuming in this -- are you also assuming in this that the cesium is the worst case --

MR. HINNEFELD: No, I think what the situation is, is that what we are saying is that other fission product radionuclides would be handled in the same manner to the extent that intakes would be similar for those, unless they were on a particular program and had an RWP with bioassay and had bioassay in their record, which would mean you would want to use their bioassay, because it

may result in a higher intake than this sort of casual -- because then you take them -- if they are on the bioassay program, they move out of the unmonitored category at least for that specific radionuclide, into that -- into a monitored category. Now, I don't know if they are still going to get the unmonitored for casual exposure or not, but, so they might still get that.

But they would have an intake they say -- if they are on a strontium bioassay, they would have a strontium dose calculation from their strontium bioassay. If they had no, if they had no bioassay, then you would have an intake rate of so many picocuries per day, and based on his cancer, you would choose from an inventory, if you've written down the inventory of nuclides you are going to choose from --

CHAIRMAN GRIFFON: But the picocuries per day is based on cesium --

MR. HINNEFELD: It's based on cesium in vivo, right.

CHAIRMAN GRIFFON: So you are assuming the worst case intake is based on cesium. You are deriving doses --

MR. HINNEFELD: For unmonitored people.

CHAIRMAN GRIFFON: Right, for unmonitored. I'm just trying to get a sense of what you are --

MR. HINNEFELD: The values of the population of the monitored workers bounds the unmonitored workers.

CHAIRMAN GRIFFON: Right.

MR. HINNEFELD: And like I said, it would be nice to know --

MR. FITZGERALD: Well yes, the only -- why we're on this, since we have moved away from the ratios that we used before is if you are going to go with cesium-137, is that --

CHAIRMAN GRIFFON: Is that bounding

--

MR. FITZGERALD: Is that bounding, because on the other -- you know, we were talking about this issue with the --

MR. STEMPFLEY: Well, if you take it and apply it as the entire radionuclide, those methods would propose it would be bounding because you are taking the highest radionuclide and it's not likely that they got all of that amount for some off the wall radionuclide, so we propose it would be bounding based on that.

MEMBER MUNN: Certainly, the bulk of the evidence of all we know about mixed fission products exposure would substantiate that position.

DR. MAURO: This is John. I'm trying to get this clear. Let's say you have a number of workers that have whole body counts, and of those, a number of them, you see positive cesium-137 results, and let's

assume for a moment that there's good reason to believe that those workers, where you are limiting workers with respect to fission product exposure, okay?

So you are sitting pretty good then, okay? You say we've got a group of workers that we believe captures the high-end exposures that any of the workers there might have experienced.

So you are sitting pretty good. You can say okay, then you could go with the 95th percentile, 50th percentile intake for cesium.

But you don't have strontium and you don't have many other radionuclides, and of course you are not going to see strontium with your whole body count. You would if you had bioassay, but let's just put the bioassay on a shelf for a minute.

So you have a chest count, you've got a bunch of workers, you could make your

case that you have the worst workers, the workers that had the highest potential for exposure to fission products. Now the next question is what are you going to do about other radionuclides, because if you have cesium-137, somehow that got out, became airborne and was inhaled, other radionuclides, other fission products could very well have become airborne and available for intake. Do you -- have you established a method for assuming other -- and they would be important, like, strontium would be very important for bone cancer. Would you simply assume, like the hook I mentioned earlier, that well, they are all there in proportion to the product of the burn up and the fission yield, you know, that those two go sort of -- you know, you'd have to find a way to assign some strontium. You wouldn't just assume there was no strontium, especially if the person had a bone cancer, and if you were developing a coworker

model to be used for people with bone cancer.

MR. HINNEFELD: John, I think -- I think what would happen is that there would be an expectation that there would be bioassay for strontium in that case.

And so you would have -- you know, in that case, because what we have are the -- an intake rate from a monitored population. That's what the coworker is based on.

And we believe that bounds the unmonitored population. We believe it would bound, that that intake rate in terms of activity rate, would bound an unmonitored population for other radionuclides if that other radionuclide would be preferential to, quote, preferential to the claimant, meaning if you had a skin -- or a bone cancer, we would probably better off if they were strontium rather than cesium.

DR. MAURO: Okay.

MR. HINNEFELD: So that's for the

unmonitored person. The situation you are talking about, yes, they are working with stuff, stuff gets out, presumably that's why you have an in vivo monitoring program that has these cesium data, that we also say that you are working with strontium, it gets out, you are going to have strontium bioassay in this person's record, and that will form the basis of an actual intake, not a coworker intake. Do you understand?

DR. MAURO: I got it. Okay. So critical to this is a degree of confidence that people that had a potential for exposure to strontium did in fact have a bioassay --

MR. HINNEFELD: So we are back to the question of why were people monitored, what was the category, what were the reasons for people to be monitored.

MR. FITZGERALD: And the other question, I think I even raised this to you Greg, a couple of weeks ago, was you know, is

OTIB-62, is that something that needs to be modified with something of this kind in mind, that you know, it hinges on -- the hook of cesium-137, but what directions for the dose reconstructor would you have if in fact the person comes in, so I separate the strontium-90 at CMR, you know, would you in fact, you know not use cesium if you have strontium-90 as your source term.

I mean that's the kind of, you know -- the 62 sounds like a good going in proposition but there may be some tweaking if you are going to use it in that way.

DR. MACIEVIC: Well, to get to the actual dose reconstruction and how you apply it --

MR. FITZGERALD: Right. If you are talking to a dose reconstructor about mixed fission products and cesium-137 is your hook, that may have to be thought about.

DR. MACIEVIC: Yes, I mean, because

the -- on everything we are talking about, are you going to have to update the TBD to state specifically for the dose reconstructor how you are going to apply this.

MR. FITZGERALD: That's issue 3, but that was my comment a couple of weeks ago, is I looked at this thing and said it appears that given the discussions, we kind of have, in a sense, looked toward modifying some of those premises in the OTIB and I think your response was well, of course we have to take a look at that. So I think this is one of those tweaks, as to the situation.

Now the other thing is why were people monitored, which was the question that Stu raised, you know, given these three facilities that seem to have actual monitored MFP emissions, a fairly significant source, too, I mean, it's definitely not insignificant, I think just nailing down, you know, what were the operations and because you

can, you know, actually identify the piece of CMR, the piece of TA-48, and if it's something like strontium-90 separations, I would look for strontium-90 bioassay data. If it's something else that -- you know, just to validate the fact that this will work for the two or three facilities where you clearly have MFPs, in fact MFPs that are being emitted to the environment.

So they clearly have operational work in this mixed fission product. You know, can one at least characterize the source term and be clear whether or not there was any type of program or, you know, evidence of RWPs, evidence of any kind of routine program at all.

DR. MACIEVIC: Well, I mean, we are making the assumption that the TBD itself on Site Profile and other -- don't state any of this, and I can't remember exactly back, and I haven't read it in a while. But there are

several definitions and specifications of what's going on in different facilities and what kind of radionuclides to expect, so I mean something like that could be made as a -- brought back up as a summary report from the TBD to say discuss what the source terms are for particular places and activities.

MR. FITZGERALD: More so time.

DR. MACIEVIC: I think -- I mean, linking in the things --

(Simultaneous speaking.)

MR. FITZGERALD: Where there are RWPs where people are monitored, can you, one, get that confidence level that you know, there was data being generated from these particular facilities, and you know, if the practice stayed the same for some length of time, they might have identified MFPs but didn't do anything about it, didn't have a separate monitoring program or didn't have any need to monitor for it specifically, even though that

may have been the principal nuclide in that particular operation.

DR. MAURO: Joe, this is John. I've got a real quick question for you. So, they had fission products, but they were actually doing chemical separations where they would separate the strontium or the cerium or the rubidium or whatever from the mixed fission products?

MR. FITZGERALD: CMR had just about everything on their site in terms of chemical separation. That was the entire facility mission.

DR. MAURO: Okay, so everything I said before about --

(Laughter.)

DR. MAURO: Based on fission products, throw that in the garbage.

MR. FITZGERALD: Right, right, right. We already did, John.

DR. MAURO: Okay. You could have

stopped me, you know.

(Laughter.)

MR. HINNEFELD: We have never been able to up to now, John.

MR. FITZGERALD: Well, I don't know where you want to go but I think --

CHAIRMAN GRIFFON: Well now, I think I know where we want to go. We want to go to lunch and when I come back I'll try to do what we did before with mixed activation products, try to summarize, and path forward and so let's take an hour and think about this over a snack.

(Whereupon, the meeting was in lunch recess from 12:00 p.m. to 1:06 p.m.)

(1:06 p.m.)

MR. KATZ: Hello, everybody, this is the LANL Work Group. We are just coming back together after lunch break. And I think we are ready to review sort of action items after the last discussion.

CHAIRMAN GRIFFON: Yes, so for the mixed fission products, I'm not quite as prepared with a list as I was for the last one. But I think, you know essentially, I think we need to have NIOSH provide the model for using cesium-137 vis a vis OTIB-62, and I -- I mean the one fundamental thing for me, and others can jump in here, but the one fundamental thing for me is to have a better justification of why the intakes -- the intakes, not the doses -- but the intakes will be bounded with the cesium-137 for all the other fission products.

And I think, you know, you seem to

say we are pretty sure, you know, that's the way it's going to be, if you can -- right.

MR. STEMPFLEY: Like examples.

CHAIRMAN GRIFFON: Yes, or write out your sort of justifications. And then the other part, the only other part I think would be to -- well, maybe there is more than one other part -- a question of, still the question of who was monitored and how was the in vivo set up, so was the cesium-137 monitoring routine monitoring, was it driven by workplace indicators or whatever.

So who -- who was monitored. And then I am not sure about the last one, but I remember this question of whether -- I mean I guess it sort of ties into that first one, to justify the cesium intakes and bound the others, I mean, because given the operations that went on at CMR, right?

I'm not familiar with them, but if you were doing certain, like, isotope

separation things, is it going to, is it going to sort of bound any of these sort of cases, and Joe --

MR. FITZGERALD: Well, I think that was the, sort of the corollary to who and how, was where and whether or not those operations were -- I'm not talking about trying to -- and I agree with --

CHAIRMAN GRIFFON: Do every one --

MR. FITZGERALD: Trying to map out all the campaigns --

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: In CMR, given its lengthy history, is not worth talking about, but just trying to look at things like, if you have strontium-90 separations, which did take place, at some point would this work for that and how so and if not, how would you handle that with the coworker model.

And I think we talked about that, that maybe in that case, you know, strontium-

90 would be your marker and that would be handled case by case.

But just some kind of approach that would address the source terms that you would expect to have to address in CMR, not exhaustively, but with some illustrative examples, meaning, again, going back to these emissions from CMR and TA-48, clearly mixed fission products were being handled in fact in emissions into the atmosphere. Some of those operations, would this in fact -- would this encompass that, and do you have any data, cesium-137 or other data, or strontium-90 data coming out of that, that would be the benchmark, that look, for that particular operation, and two or three examples of those kinds of things, I think, would help.

MEMBER BEACH: It gives you something, somehow to validate it, right?

MR. FITZGERALD: It would serve to validate that this model would, would

encompass CMR. CMR is probably the worse factor but we might take a quick look at TA-48. I look at this list, 48, 50 and CMR, which is TA-3, were the three that showed any mixed fission product emissions, i.e. they have operations and actually, by virtue of the stack that's involved, you can actually get down to that part of the facility that's implicated.

It might be helpful just to figure out and narrow it down to that particular operation and some of these may not turn out to be useful but some of them may turn out to be good markers for testing this thing against.

So I guess it's just sort of a bit of a validation test against some of the operations, not exhaustively, not for all time, but certainly ones that would be useful to look at and you know, that's where I would pin that one.

CHAIRMAN GRIFFON: Does that cover -- I think that covers what we -- all right. I don't know what's next on our agenda. Oh, exotics is next I think. It makes sense to -- we sort of touched on that subject already a little bit, but if we can go into number 2 on the agenda items. Already at number 2. Look at that.

(Laughter.)

CHAIRMAN GRIFFON: Number 2 is exotic radionuclides. So I don't know who wants to lead off.

MR. FITZGERALD: You have 1E and 1F, and I'm deciding whether we need to address those or not.

DR. MACIEVIC: Well, 1E we have already been -- on the checklist --

MR. FITZGERALD: That was the checklist.

DR. MACIEVIC: -- going through that.

MEMBER BEACH: What year was that checklist started? Do you know?

DR. MACIEVIC: Seventy-seven --

MEMBER BEACH: Seventy-seven? That's when it started?

DR. MACIEVIC: Oh, when it started? It started like '75 --

MEMBER BEACH: Okay.

MR. FITZGERALD: I think we talked about the checklist. We probably don't need to -- I do think that there's some important qualifiers that we outlined as far as how they -- they are another reflection of something that was being put in place, something to be aware of, but I'm not sure it's definitive as far as answering the issue we are talking about.

1F. This was the issue where there was a 2000 audit that the, that the area office did and found some questions regarding the reference library at LANL, and this is

where we were trying to interview internal dosimetry staff, and they elected to receive written questions, which we compiled and I talked to Greg about it and we sent it in, and their responses are on the SRDB.

But essentially, the answer was yes, we have got to sort of dinged on a quality assurance level but it didn't reflect our ability and the fact that our reference library was still available. So that was sort of a general response that even though we were found deficient, it wasn't something that undercut our ability to in fact see these particular nuclides.

The reason we brought this up is because the nuclides in question were actually pretty significant. Thorium was one of them and you know, it's sort of a little dramatic, but again, they felt that it was more of a procedural thing that they didn't I suppose keep that library linked to the site and make

sure it was up to date and that their capabilities were there.

So the tab was left that way and it's all documented online. So I would propose that that one be closed out. It was something that sort of caught our attention because it involved mixed activation products and thorium-232, which is very central for our discussion, but apparently did not have as much of a significant impairment to their ability as was suggested in the audit.

So I think we squeezed that one for all it was worth and managed to get that response, but that was all we got. So, that will then bring us to issue 2 on the exotics.

This was another one that was central to the petition, because of the fact that it was cited in the ER for the previous SEC as an issue that needed to be pursued further. It was sort of left as an open item if you may.

So it wasn't even declarative necessarily in the first evaluation, but it was addressed in the second evaluation in a more comprehensive way.

And essentially, what was proposed was a substitute nuclide using plutonium or I guess americium was the second one? I think it was those two.

DR. MACIEVIC: And uranium is also --

MR. FITZGERALD: Oh, uranium is also --

DR. MACIEVIC: Thorium and then you have plutonium.

MR. FITZGERALD: Right, assuming that if you don't have bioassays for -- specific bioassays corresponding to these exotic nuclides, if one, this is the premise, if one handled them in a very similar or equivalent way, you could assume that it would -- that the site distribution, dose

distribution for, say, plutonium or americium or uranium, at the, what, the 50th or 95th --

DR. MACIEVIC: It would probably be at the 50th.

MR. FITZGERALD: Fiftieth percentile.

DR. MACIEVIC: I don't think you made an exact statement yet on it --

MR. FITZGERALD: Okay, well --

DR. MACIEVIC: You're talking 50th percentile.

MR. FITZGERALD: At some distribution value would be bounding of dose to those particular nuclides, and our response was okay, you know, you know, if you are going to apply site-wide distribution, we have to at least be clear that the handling was in fact equivalent for all these nuclides, and that in at least two cases -- we had two examples, one of which came out of the Tiger Team, where thorium powder which was being handled

certainly not in the way you would handle plutonium.

So that was one example and we had gotten information, actually from Sam Glover, in some of the work he was doing on neptunium, had -- there was some connection with Hanford that needed to be pursued.

Now, some of this is classified but all I can say is that we wanted to sort of poke at this a little bit to make sure that this overriding assumption that this equivalency existed, therefore you could apply these substitute nuclides, held.

And that's kind of where we left it and I guess we wanted you all to -- some information that we had at least on the two examples that we raised.

And that's kind of it. And your response was a little cryptic, and I guess we went back and forth a little bit trying to figure out, and I wasn't sure if some of this

was classified, but you know, exactly the basis for assuming that you know, the approach follows, that it applied.

DR. MACIEVIC: Well, and this, again, is going to be for unmonitored workers --

MR. FITZGERALD: Right.

DR. MACIEVIC: And applying this to them and using that whole range of nuclides, and the point being that if they are handled in a similar way, that you are -- that for all these radionuclides that are listed here that go through down onto the next page, they would be covered under that because -- under that OTIB-62 for anyone who can, who can show or state that, because it's not going to be applied site-wide and that everybody is going to get these values. It's only the unmonitored and people of the Class who were appearing in this too.

So that's why these answers are as

such, that this does fall under that too, that it can -- because you can expand, as long as it's similar enough, as a radionuclide, you can put it in as one of the radionuclides to use that 50th percentile intake and then see what's --

MR. FITZGERALD: As long as you -- hold on a second.

MR. KATZ: Excuse me, someone on the line has a child in the room, and you are not muted, so I just remind you, please mute your phone, particularly for the sake of the other folks on the telephone. Thanks.

MR. FITZGERALD: What I was going to say is that assuming that the exposure pathway, likely exposure pathway would be equivalent, and the reason we raised those two examples, at least for thorium in particular, since they got a pretty heavy whack from DOE on the Tiger Team, because they were not -- not having operational controls and the way

that program, or that particular activity was handled, and certainly not doing the bioassays they hated. That was one where we'd like to get some sense from you how that equivalency issue would work in that case, and that's not really classified. So anything you say about that, and granted, it wasn't like kilograms --

MR. MILES: I think we were -- if I'm remembering the papers, they mentioned gram quantity --

MR. FITZGERALD: Right.

MR. MILES: And that we are linking thorium to uranium handling.

MR. FITZGERALD: Okay.

MR. MILES: Not plutonium.

MR. FITZGERALD: Right.

MR. MILES: So we're not suggesting that they would have handled thorium with the same controls as what they would have plutonium, but similar controls to what they may have used for uranium.

I can -- I mean I could see an incident where you might have gram quantities of uranium that you could safely work with on a bench top without having a glove box or something like that.

You know, I think what we are saying is that the airborne levels that would have triggered alarms in and maybe the surface contamination levels kind of thing, that they would look toward would have been similar, as far as -- I mean it's --

MR. FITZGERALD: But thorium would have been a different source term than uranium in the sense that wouldn't it be more radiologically significant?

MR. MILES: Well, it is. It is. But again, it's, you know, it takes a lot of mass to get a significant dose. I mean I think if you are just working with gram quantities on a -- just one example here, you know, you can point to, it wouldn't seem to be

a major source term.

MR. FITZGERALD: No, I'm just trying to get to the substitute thing. You would substitute uranium as the source term for --

MR. STEMPFLEY: The intake value and apply it as -- thorium, based on that. And it's the same model process.

MR. MILES: You end up getting better -- bigger doses and different doses --

MR. FITZGERALD: Right.

MR. MILES: To different organs.

MR. FITZGERALD: But the intake would be equivalent -- you would make equivalent -- make equivalent the uranium and the thorium --

MR. MILES: Activity.

MR. FITZGERALD: Right, activity, right.

MR. MILES: Not equivalent dose.

MR. FITZGERALD: Right, not

equivalent dose but equivalent intakes. And I guess we can't really talk about neptunium as much, but again, yes, it was more from the standpoint of just making sure these specific campaigns that we were aware of could be handled under that methodology, and it sounds like it could be. So I don't think we have any more to add, you know, we wanted those two or three examples at least validated.

The actinium I think was something that maybe 'identifying information redacted' raised about a time frame issue and I think you addressed that being not an issue because -- let me see -- oh, protactinium, I'm sorry.

Your response, the table seems okay, check the time frames for presence in CMR as a waste material. So I guess that's still something you are dealing with.

CHAIRMAN GRIFFON: For protactinium?

MR. FITZGERALD: Yes. I think the

question there was the time frame issue and check the table based on the time frame for protactinium. The issue is protactinium had been a figure at Los Alamos after a certain date so it didn't seem like it was an issue, but then somebody raised it, I think, well, that's a waste material, it very well could be at CMR and I think that was the way it was done.

So you're okay as far as the operational phase, it looks like. Your table is fine, the date, from the standpoint of the dates, but the discussion of whether it still resides at the CMR as the source term.

MR. MILES: Yes, I don't think that table is complete. I'm sure there's dust for every activity that, every, every -- apply the best effort, effort to try to, try to lay them out --

CHAIRMAN GRIFFON: So is that, that then would be the basis for dose assignment,

in other words if you worked in an area where --

DR. MACIEVIC: The table --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: Has buildings and time frames and --

MR. MILES: No, I don't think that links to it because I don't think we can put people in place.

CHAIRMAN GRIFFON: That's what I wandered. So are you always going to use --

MR. MILES: So it -- yes, that table doesn't necessarily need to be complete in any way --

CHAIRMAN GRIFFON: Oh, okay.

MR. MILES: Because we are not, we are not suggesting -- we don't know where people worked anyway a lot of the time, who were doing dose reconstructions.

CHAIRMAN GRIFFON: So are you just going to use the worst case actinide?

MR. MILES: Well, if we don't have -- if we don't have the -- you know, if we, if we don't have the bioassay data for them, we would use the -- if it's one that we are linking to the plutonium, I think we have got the curium that we -- is more, at a higher specific activity, and we used the Pu-238 coworker data to come up with intakes for that for unmonitored workers.

And what we are -- would be taken is whatever the activity would be in dpm and then basically assign it to every exotic nuclide that we can -- we have got a list, we can think of, basically, and assign that intake to all those different radionuclides and depending on the cancer, determine which one gives that cancer site the highest dose is the one that would be selected.

CHAIRMAN GRIFFON: So across the board it would be --

MR. STEMPFLEY: What you're saying

is who do you assign it to --

CHAIRMAN GRIFFON: Yes, yes.

MR. STEMPFLEY: And I think there is a certain amount -- a certain challenge associated with, you know, trying to identify, that's -- I don't think we have an answer for every situation. We are going to do the best, the proposed method, do our best to assign what's appropriate, but I -- you know, in some cases there is not a whole lot of information on the dose reconstruction. So you know, I don't --

DR. MACIEVIC: And we'd have to look at specifically, like, for the security force or for the fire fighters and people that have been associated with a particular facility where you know there's actinides but they had no bioassay or they're not monitored for anything at a particular time in any bioassay, you would assign them that information. But it would be coming out of

the information from the dose reconstruction and not just an across the board.

I mean, again, that's an issue that can even be discussed and looked into about assigning this to, if you can show that every guard, every fire fighter has rotated through all these facilities on a routine basis and has been in them, the potential of assigning a fraction of a -- of the 50th percentile for everybody, or people who say specifically I worked in these buildings as my routine workplace, they would get the full amount.

So you know we're -- that part hasn't been -- you know, the actual assignment and how exactly much of that percentage you get, the full amount, do you get a part, how that is done, because it's going to be, like I said, based from info given during the ER process, information that's given in when the worker talks about where he worked, how long he worked and different types of things that

were involved. And if there's no bioassay involved, or any kind of monitoring, you would assign this.

MEMBER MUNN: Somehow in all that discussion I completely lost track of what is the question. The question about protactinium and the time element is, is there any of it anywhere that Carmen Sandiego might know, or what's the question?

MR. FITZGERALD: On protactinium the issue was is it in fact, as a figure, as an exotic, in the time frame we are talking about, which is post-'75 and I think the sense of the group was not likely because it was a -- it's a very logical source that was used in weapons systems early on in the '50s and '60s and then -- but, somebody said well, but you know, you have residual and waste materials that are processed in the lab and there's a chance that you have some in CMR which is your chemical processing facility, and therefore

you have to at least be aware that protactinium isn't off the site completely and may in fact be an exposure source in the CMR.

MEMBER MUNN: And so how are you going to -- how does one determine where in the world is protactinium and how does one determine whether it has any bearing at all on a real dose estimate?

MR. FITZGERALD: Well, I think that's what we are just talking about. The issue is --

MEMBER MUNN: Well, I missed all that.

(Laughter.)

MR. FITZGERALD: Well that was the conversation that you --

(Laughter.)

DR. MACIEVIC: The thing about the model is --

MEMBER MUNN: How could you identify that?

DR. MACIEVIC: Well that's the thing. You have to -- and one of the points we are looking at now, is where -- with this kind of model, if you know you have got X, Y and Z actinides in the facility, you can run those three actinides through the model we say and we say what is the highest dose and here it is.

Now if you find there's five others that are in there, you can also add them to the list and then run those through and give the highest dose.

Now, how a person is assigned to be in the facility is --

MEMBER MUNN: That's not the question I was asking.

DR. MACIEVIC: Yes, but you --

MEMBER MUNN: The question I was asking is, what I heard proposed is how do you know where in the world all the protactinium is on this site, how do you define that and

does it matter? I mean, that's my question. Does it matter?

His question was, where is all this stuff and was it there after 1975, and I didn't hear anybody talking about that. We were talking about --

MR. FITZGERALD: Okay, well actually, this is one where I think we are in violent agreement. Certainly the sense at the last meeting was that it wouldn't be an issue in the time frame we are talking about, the modern era, however we want to be conscious of the fact that it might figure at one facility which handles the chemical waste, which is CMR.

So I guess given the discussion we just had, if it were to come up as a source term, it might be something that would be factored into this approach, but it may never come up --

MR. MILES: It is, it is, it is an

exotic that we did list and acknowledge in the ER along with several of the other ones, and there was even an example of a bioassay that they did as late as 2008, though I don't think -- I don't think we are trying to say that there was absolutely no possibility of making protactinium-231 exposure --

MR. FITZGERALD: Well, as an operational source, it figured prominently in the early days and all that was said was you might see it -- you might see some residual levels here and there and the system should be able to accommodate that, and I think what you are saying is that it can.

I don't think there's any issue.

CHAIRMAN GRIFFON: Let me get back, can I get back to my -- I may have one remaining issue, which is just the fundamental, I mean it's a fundamental issue which we go through in every Work Group process. You are saying that a lot of this

will depend, at least I heard sort of two different things, you are saying a lot of this will depend on the dose reconstruction process, on placing these people in these areas and whether they get different radionuclides assigned.

Earlier Chris said we don't know where people are going in and out of buildings, so my question is, before we can opine on whether we think this is bounding for all workers, I'd like to know what we are opining on.

I mean, to say that well, we haven't sort of fit it all together, we are going to use uranium and plutonium to, you know, to get intakes and then use it for these other isotopes in certain situations, you know, that doesn't leave me with a warm, fuzzy feeling.

And if the question is are you going to use the worst case all the time, in

other words if you look at it by isotope, by cancer, and you know, and always assign the highest, or -- that is the intent. Okay I didn't understand, because before you said we are going to look and see what -- based on what they said in their questionnaire --

DR. MACIEVIC: No. I mean -- where, if the person said, you know, he's worked in CMR his whole lifetime, and we know there is a specific set, you know, of radionuclides with the actinides, and you have run all the actinides through there.

But you do -- we are going to give you the highest value of whatever set we have developed here, which we have all the actinides in, but if there's something else that we can add to that set, that can be covered using the plutonium intakes or the uranium intakes, that can become one extra of the nuclides that is also run through that model to come up with the highest value dose

to the organ in question.

MR. EVASKOVICH: Can I ask a question, Andrew Evaskovich. From the document that I submitted and one of the reports, it stated, "Specific controls must be put in place to ensure that appropriate neptunium bioassays are performed on workplace events involving neptunium because the standard plutonium bioassay would be ineffective in detecting or quantifying neptunium intakes."

Additionally, it said, "In addition to bioassay concerns, there are potential inadequacies in the assessment of neptunium airborne contamination from instruments designed and calibrated for plutonium.

So, basically that tells me you can't substitute plutonium for neptunium. Am I correct in that assumption?

DR. MACIEVIC: What that is saying there, you have -- if you were just going to

take, if you've got plutonium and you were going to call it just neptunium, you would not -- they can't do a bioassay for the neptunium, is what they're saying in there, right? That they can't --

MR. EVASKOVICH: They're saying that they did not do it and they can't use plutonium bioassay to determine the quantity for neptunium --

DR. MACIEVIC: Right, they're not --

MR. EVASKOVICH: I mean these guys are talking about quantity.

DR. MACIEVIC: But it's -- they are -- we are not using -- we are using the intake value and saying that is equivalent to what the intake would be for the radionuclides in neptunium and giving you the dose associated with that, or running that whole cadre of nuclides is giving you the highest value of that.

It's a different thing. We're not using --

MR. STEMPFLEY: We're not trying to get neptunium from plutonium. We're just taking plutonium and applying it as the worst case radionuclide, which may be neptunium, that quantity. We are not trying to take that and say, based on this, there's an equal quantity of neptunium. We are just -- for the purpose of the proposed method in the valuation for bounding the dose, take that pile and apply it all as one radionuclide, that quantity, that intake activity --

MR. EVASKOVICH: Yes, but it specifically says quantify.

CHAIRMAN GRIFFON: What is the --

MR. HINNEFELD: Quantify --

MR. STEMPFLEY: Well, you can't --

MR. MILES: What he's saying, if you get quantifies -- him from a plutonium bioassay --

MR. STEMPFLEY: We're not trying to do that.

MR. MILES: Which is --

MR. STEMPFLEY: Yes, but we're not trying to do that in the Evaluation Report.

(Simultaneous speaking.)

MR. EVASKOVICH: Inspection of the Environment, Safety and Health Programs at the Los Alamos National Laboratory November 2005. That's the title of the report. It's on page 35 that that was mentioned and the same thing a little bit below it in another paragraph.

So when I read that I see that you can't quantify from one to the other. That's where that stands. And you guys are saying well that's how we are going to reconstruct dose.

DR. MACIEVIC: No.

MR. STEMPFLEY: That's not how we are saying we are going to reconstruct dose. We are not trying to quantify --

MR. EVASKOVICH: Well, you're going to take the quantity of plutonium and you're going to say okay, this applies to neptunium, but I read that as saying that they are saying that they can't do that.

DR. MACIEVIC: No, what -- it's a very shaded -- what we are taking is you've got all these plutonium workers with thousands of samples, people who were actually exposed and have positive urine samples. You develop an intake for those samples, say for each year, here's what the intake was, you know, for the distribution, for those samples.

And now, you forget that that's plutonium. We are saying that is now neptunium. That is now actinium. That is now curium. And then we want it all for a particular organ and say okay, what gives me the highest value, that's the dose we are going to give you.

So we're not, we're not trying to

make a correlation between plutonium, a plutonium sample and neptunium sample and say wait, the methodology for doing an analysis for neptunium can't be used, or the plutonium can't be used for the neptunium in the way they did the sample. We are not doing that. We are just taking a number up here, based on intakes that gives you a value to workers who are exposed and then taking that number and --

MR. HINNEFELD: Well, we're talking two sides of the question. We are talking about a coworker issue.

DR. MACIEVIC: Right, you've got somebody who's not monitored.

MR. HINNEFELD: Exactly, okay. What Andy is pointing out here is, according to this review, a population that you would expect to be monitored, is this, seems that you are referring to an activity that you would expect to have bioassay monitoring on, that then uses neptunium, and the bioassay

approach, according to this, doesn't account for that.

So as, whereas for a coworker approach, if you say, well, there might be this sort of unmonitored coworker exposure that could be as high as the monitored plutonium population, that's kind of what this argument is, this doesn't relate to that. This relates to a population that apparently should be monitored. That's kind of the conclusion I'm drawing. It should be monitored for the material they are working with, which in this case included neptunium.

But according to this, they were being monitored by the standard plutonium bioassay. So this is an argument against our saying that people who should have been monitored for these other things would have been monitored and therefore they would have a neptunium bioassay in their record and say -- and therefore we would do a neptunium intake

because of their neptunium bioassay.

What this appears to say is that those people would not have a neptunium bioassay in their record. So to me, that's kind of another argument. It's not -- it's not a coworker argument that's being made here. It's not an argument against our coworker approach. It is an argument about the sufficiency of the monitored people and do the monitored people really have the bioassay they are supposed to have, so that we can know who is appropriately monitored and therefore do the monitored intake assessment. That's what this is about.

MR. EVASKOVICH: Well, it said detecting or quantifying and we are talking the quantity --

MR. HINNEFELD: Well, I agree.

MR. EVASKOVICH: We are talking quantity --

MR. HINNEFELD: I'm on your side

here.

MR. EVASKOVICH: Well, see, we are talking intakes of plutonium and so you are going to assign a plutonium intake to neptunium, but it says you can't quantify using the plutonium intake --

MR. HINNEFELD: Yes, and --

MR. EVASKOVICH: That report and that section.

MR. HINNEFELD: Yes, the coworker model that we are proposing to use is -- doesn't per se try to use plutonium bioassay to quantify any of their intakes.

MR. EVASKOVICH: Well, I know you are going to assign an amount according to the plutonium intake and --

MR. HINNEFELD: Yes, and what we are going to say is, for people who were monitored, these other, you know, neptuniums and other things we call exotics, where it should have been controlled in the same way,

and so the dose to these other exotics should be bounded by the people who were monitored for plutonium.

So that is a little different than saying that the plutonium bioassay correctly quantifies the neptunium. That's not the argument that -- that's not a basis of the argument of the coworker approach.

What you have pointed out though, is that it appears that people who we would think would be monitored for neptunium, might not actually have neptunium bioassay in their record, would only have plutonium bioassay, which is another flaw.

So it doesn't hit to the coworker model. It gets to the completeness of the bioassay record for people who were monitored.

CHAIRMAN GRIFFON: But it seems to challenge the fundamental premise that -- and this is in 2005 -- it seems to challenge that fundamental premise that plutonium monitoring

sort of was the surrogate for anything else.

MR. HINNEFELD: Well --

CHAIRMAN GRIFFON: At least the neptunium, they are challenging it, aren't they? I mean that's the way I read it.

MR. HINNEFELD: Well, that's what I'm saying.

CHAIRMAN GRIFFON: For that individual, that is expected to be exposed to neptunium, they are saying that you can't effectively quantify it.

MR. HINNEFELD: Well the plutonium bioassay won't quantify neptunium intake. That's a true statement.

CHAIRMAN GRIFFON: And it doesn't say effectively bound either, so I don't --

MR. HINNEFELD: No, it won't bound --

CHAIRMAN GRIFFON: I mean it might give low or high.

MR. HINNEFELD: It will not

quantify -- plutonium bioassay will not quantify neptunium intake. That's what -- no arguments.

CHAIRMAN GRIFFON: There's a little uncertainty

in the way this is written.

MR. HINNEFELD: No argument here.

CHAIRMAN GRIFFON: A little uncertainty in the way it 's written. But --

(Simultaneous speaking.)

MR. HINNEFELD: Our argument is a little less direct than that.

MR. EVASKOVICH: Well, that, but taking into account the air monitoring, the air monitoring would be inadequate as well for detecting neptunium release, it just kind of strikes me as unworkable.

MR. HINNEFELD: Well see, I'm kind of on your side here.

CHAIRMAN GRIFFON: Yes.

MR. HINNEFELD: It may not have

sounded like it, but I'm kind of on your side.

MR. EVASKOVICH: Well, yes, that's just it, it doesn't because I mean, for the coworker model, it strikes me, is it won't work. That's why I included it. I saw that as a -- wait a minute, you know, and because if you're going to, if you're going to say it was equivalent to a plutonium intake.

MR. HINNEFELD: Well, they're saying the measurement techniques that are used for plutonium don't translate, aren't good for quantifying neptunium. That's -- that's what that says, and we agree with that.

In my view, the coworker approach doesn't rely on that. It relies on a bounding assumption that the people who were monitored, would be more highly exposed than the people who weren't, and therefore -- so the people who were monitored would bound the exposures of people who weren't --

CHAIRMAN GRIFFON: But it also --

MR. HINNEFELD: And that plutonium and neptunium would be controlled appropriately and so --

CHAIRMAN GRIFFON: But it also assumes that those who were monitored, were monitored for the other actinides --

MR. HINNEFELD: Yes, well see --

CHAIRMAN GRIFFON: and that assumption --

MR. HINNEFELD: That's, yes, part of the coworker approach is that people who were exposed to other actinides would have been monitored for those actinides, which this seem to indicate that they were not. For this particular case, maybe they weren't.

MR. EVASKOVICH: Well, and there's other issues in there as far as like they cite neptunium specifically but let's see. "Radiological hazards are prevalent throughout GA-55. However these hazards also have not always been subjected to appropriate

evaluations and work planning mechanisms and interface between line management and HSR."

And then they cite the neptunium, and "Standard controls such as plutonium bioassays would not be adequate for neptunium, but were not evaluated and modified for this operation."

So they are saying, they are using neptunium as an example of how they work doing that.

MR. HINNEFELD: Right. Right. Right.

MR. EVASKOVICH: So --

CHAIRMAN GRIFFON: Well I suggest that at least as a sub-action, you guys should look --

DR. MACIEVIC: Right.

CHAIRMAN GRIFFON: But I mean that's in 2005 too.

MEMBER BEACH: That's one of several.

CHAIRMAN GRIFFON: Yes.

MR. HINNEFELD: And the interesting thing --

DR. MACIEVIC: I know you were going to have to move your SEC to present day, whatever that present day is.

MEMBER MUNN: That's ridiculous.

MEMBER BEACH: Well, it goes to December 31st, 2005, so --

MR. EVASKOVICH: And there was like another -- and I cite another incident where at CMR, they were working with some canisters there, and a canister was opened causing a release of americium and neptunium.

And in that report, like I told you earlier, when I read these reports I don't know if they are summaries, you know, because a lot of them are. But they don't indicate whether or not bioassay was done or even nasal swipes issued, you know, and if I don't -- if I don't see it written down, that's telling me

it didn't happen, but you know, maybe -- maybe that's --

DR. MACIEVIC: Some of these reports also get into the classified area too, when they start discussing --

(Simultaneous speaking.)

DR. MACIEVIC: But when there's other issues that sort bogging down how much they put out.

CHAIRMAN GRIFFON: This also ties into what Stu was saying earlier about the 1990, the -- you know, we expect to have a technical basis, and this is a 2005 report which seems to be challenging that, maybe they're --

DR. MACIEVIC: Well, we can go back over that one too. I want to get it out and look at it line by line and see what they do say but I -- from what I read --

CHAIRMAN GRIFFON: What do you think Joe? Anything else on --

MEMBER MUNN: At the risk of being repetitive, being crystal clear I hope, we settled the question of whether protactinium is --

MR. FITZGERALD: I have been settled on that on day one.

MEMBER MUNN: Okay, okay. That is now a closed issue, right? We don't have to address that.

CHAIRMAN GRIFFON: What did we close, Wanda, while I wasn't listening?

MEMBER MUNN: The protactinium -- where it is.

CHAIRMAN GRIFFON: Well it's tied in with all the --

MEMBER MUNN: Yes, yes, but -- but we had a specific question on that.

CHAIRMAN GRIFFON: Oh, whether it exists, it exists on site.

MEMBER MUNN: Yes, we know that it exists and that the question is whether we

have to track it all down and do something special with it, in terms of time frame, and the answer is no. It is just simply, it will be addressed in the normal course of events. It doesn't have to be segregated.

CHAIRMAN GRIFFON: So are we at a place to make actions for this exotic? I mean I have --

MEMBER BEACH: One thing I've heard and I just want to clarify it as -- you are going to use the reports, the interview reports, when you are trying to place people in certain buildings to reconstruct their dose for unbadged, unmonitored workers.

DR. MACIEVIC: Any information from that, yes.

MEMBER BEACH: Right, so how are you going to deal with people that you may be working with a spouse? Because that totally blows that approach out of the water in my view.

DR. MACIEVIC: Well, like I said, we haven't -- that is the current process we are looking at and it's something that if we have to, you can assign a general dose to a specific worker population and say, because fire fighters or the security forces were throughout all of the facilities, if a fire fighter or a security guard has a DR, we will assign an --

MEMBER BEACH: Okay, I just wanted to make sure you weren't just using that in trying to place them in facilities.

DR. MACIEVIC: Right, but you are not going to always have -- yes. And I think for specifically the Class that's involved, which is the trade, the fire fighters and security, they are going through the entire site, so pinpointing where a person is if they worked there for 30 years is going to be tricky.

MEMBER BEACH: Impossible.

DR. MACIEVIC: Even trickier if they only worked there two years and they're not, you know, they moved all over the place, you're not going to -- there's no records for it and so on. Yes.

MR. FITZGERALD: Going to Josie's comment and some of the discussion we had, it almost seems like what's needed is just a rendition of what the approach is going to be.

I mean I think we understand the substitute concept and how that's being applied, but there isn't any, you know, any implementation information as to how this is going to actually be made to work.

DR. MACIEVIC: Well that would be -- well, we did the same --

MR. FITZGERALD: The table, the table we got last time. I think that -- that was helpful.

DR. MACIEVIC: We have the sample DRs as well, but this could be like sort of a

little -- what you would get in the TBD as far as how a dose reconstructor would use information for this Class of people.

MR. FITZGERALD: Yes, yes, I think that's kind of what is -- this sort of gets to what Andrew was mentioning, what Josie's mentioned and sort of what -- I can understand the actual concept itself, but how that concept is going to translate into a dose reconstruction approach seems to be -- you know, we are sketching it in now.

DR. MACIEVIC: Right.

MR. FITZGERALD: But it's -- that would be useful just to see, you know, if -- as you put -- you know, what would you put in a TBD if you were going to instruct a dose reconstructor on how to apply this concept?

Because you are going to have these campaigns and these exotics are really more associated with campaigns rather than sort of these running operations.

So that's going to be trickier to actually identify what the worker population, you know, relevant worker population might be for those things.

You know, how that information is going to serve us, how you would react and apply this -- that would be helpful. I think -- well, Mark is transcribing something now.

DR. MACIEVIC: That's where -- I think it's where we got left with two.

CHAIRMAN GRIFFON: And I have three proposed actions anyway. NIOSH should document approach for using uranium and plutonium data to bound for all exotic radionuclides that should say, and for bioassayed workers as well as unmonitored workers, because my sense is that even the bioassayed workers likely didn't have the exotic -- or maybe they did. I mean, that's --

DR. MACIEVIC: So I say for exotics

--

CHAIRMAN GRIFFON: Right. Right, they don't even do it currently, right?

DR. MACIEVIC: Right.

CHAIRMAN GRIFFON: So you basically -- second question is review the internal dose TBD document/documents for the site that should have been developed around 1990 in response to 835. What is the technical justification for using plutonium -- so controlled doses to all other exotics.

Chime in if you don't agree with these. Third is review reports on this topic identified by the petitioner, by Andrew, including the one inspection of his ES&H programs at LANL, November 2005.

And I'm assuming these are all in your original petition, are they, or no?

MR. EVASKOVICH: Yes, that 2005 document was because that's sort of where the neptunium issue originated from, but this is

below the -- because that references the 100 gram quantities, but below is where -- based on that after we came up with the substitute model.

CHAIRMAN GRIFFON: But that's just looking at this part of the petition, right?

MR. EVASKOVICH: No, that's one I just submitted here April 17.

CHAIRMAN GRIFFON: Okay.

(Simultaneous speaking.)

DR. MACIEVIC: Yes, we've got that document.

MR. EVASKOVICH: Now, another question, since we are still on exotics, and it kind of ties in with what I was talking about with source terms, they both kind of go together, is I also submitted some tables concerning exotics that went into waste at TA-54 and total amounts and my concern is, because you only list a few, you are saying we are only concerned about these, like curium,

europium, berkelium but there's, you know, a very large list of exotics that went into waste at TA-54 and some of them exceed curie amounts.

I mean what amount are you looking at to be concerned with to say okay, these could have been handled by, you know, enough people that we do have a concern, we have to reconstruct one. Yes, that's where it starts, table 4.

CHAIRMAN GRIFFON: Any response to that now or --

MR. EVASKOVICH: Additionally, this would be safety analysis for TA-48 also was radionuclides with multiple curie amounts and there was a concern with some workers in an area where they should have been monitored and they weren't that there was a potential for contamination. That's table 3 in the document.

And then the follow up after that

and that is also I believe from this 2005 report where they found that there is that potential.

So I guess my concern is, is you know, at what level do you guys become concerned, curie amount with a radionuclide and then how do you deal with that?

Are you going to stay with the substitute model?

DR. MACIEVIC: Well, yes, what we would do is take a look at the coworker model to look at these other radionuclides that you have and see how they would fit in with something like that, because with that type of scope of radionuclides and handling, it would be either you look at a dose that you can apply across the board, because you are not going to have bioassay for those radionuclides that you talk -- so it would have to be something similar to that, that at a particular facility, we take a look at those

radionuclides and see if they add it to the list of the group of radionuclides to cover that kind of situation.

We'll take a look at that, the document. Well we did look at it, but we looked specifically at those radionuclides.

MR. FITZGERALD: There's something from the last meeting of the Work Group -- the question of air sample data, whether there was any air sampling data at all available at LANL on the exotics. I don't know if in your data capture -- you didn't mention it so -- I didn't see anything in the SRDB either, so you didn't see any air sampling data?

MR. MILES: Oh, we saw tons of air sampling data, but it was gross alpha beta, and it wasn't -- I didn't, I didn't come across you know --

MR. FITZGERALD: Anything specific to any of these --

MR. MILES: A lot of -- maybe an

example or two -- a big long, a big pile, but it's gross alpha beta --

MR. FITZGERALD: It's gross alpha beta.

MR. MILES: Air monitoring and it's in, you know, typically they are followed by a CAM -- at least what I was looking at a CAM response of some sort often was followed with nose wipes.

MR. FITZGERALD: It would be interesting, going back to your earlier action item, is at what point is LANL from an internal TBD standpoint on a basis to actually be looking for if the air, you know, gross alpha beta, I mean at some point, that changed.

CHAIRMAN GRIFFON: It would seem -- I mean it would be a shock, like Stu said, if in around 1990, they didn't at least document all these things.

MR. FITZGERALD: You have this

continuum of gross alpha beta that goes from the '60s --

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: even earlier, all the way through the '70s into the '90s and it's not conceivable that's, you know, been trying to program --

MR. HINNEFELD: Did they have CAM alarms following the -- that would be associated with higher sampling?

MR. MILES: Well, there were gross alpha beta CAMs and these were the response, these were --

MR. HINNEFELD: That was air monitoring --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: I mean, I'm still a little -- I don't know if it's, I guess the word is confused. Is that the word, Wanda? Still a little confused on the -- but I'm hoping that when you document your

approach, if you can just be clear with how this question of assigning the worst case nuclide, is it the higher area, is it you know --

DR. MACIEVIC: I think you'll almost have to write something like in a procedural format to go and state how this would apply, how the dose, the example, because like I said, we have had the sample DRs that are out there, and maybe you give something that is more specific to lay it out by steps so everyone an see --

CHAIRMAN GRIFFON: Does the example DR -- it's been a while since we had those examples --

DR. MACIEVIC: Yes, that's been a while back.

MR. MILES: They go through that with the process and I mean --

DR. MACIEVIC: And you have a --

MR. MILES: Look at it and see --

DR. MACIEVIC: I think one or two that are compensable, one or two that's not compensable. So I mean the check was to see that this is not -- any time you use this you are automatically getting compensable, but that there was a mixture of both in there.

MR. FITZGERALD: I'd be just interested in, is there any application of the method that we are talking about to anybody who doesn't raise their hand during the CATI interview and says, you know, I worked with neptunium, I mean --

CHAIRMAN GRIFFON: Well, that's the question I had.

MR. FITZGERALD: It's sort of like, you know, I can understand that part --

CHAIRMAN GRIFFON: Because you can't place workers --

MR. FITZGERALD: neptunium and then, you know, you go down this path, but they don't mention it by name.

DR. MACIEVIC: Well, that's why it's going to be by -- it would have to be, well, also because you are unmonitored, you have someone who is going throughout the site, we are going to have to assign it based on the potential for a person going into these facilities.

And that is how it is going to have to be assigned. It's not going to that a person is going to write down, oh yes, I was involved with curium or actinium and other types of things like that, because it's not going to say that, more than likely.

And you -- it never gets that detailed in the CATI, what a person talks about --

CHAIRMAN GRIFFON: I guess without going and being redundant, I mean, you don't know where people are going in and out of, and you know, how can you -- it seems like you are going to have to default to worst case.

DR. MACIEVIC: Yes, you will. You'll default to the worst case and you will have to either assign it to the entire group, if a group has shown that they have access to the entire site on a routine basis throughout the year, over all their years, that they will have to get that -- that number for that period of time, because otherwise you have to be able to specifically say why I'm not doing it in this year but I am doing it in that year, not only have the detail for an unmonitored worker as to where -- what they were doing at that level. I mean it's not going to --

CHAIRMAN GRIFFON: Well, I'll wait and see, but I don't understand even how you do it for a certain group. I think it ends up being all workers, unless you, I don't know.

DR. MACIEVIC: Well, it's got to be unmonitored workers because we are talking unmonitored here.

CHAIRMAN GRIFFON: But monitored, you didn't even monitor for specific exotics. I thought we just said that. There was no monitoring for exotics. So --

MR. MILES: Well, there were very few -- bioassay you are talking about?

CHAIRMAN GRIFFON: Right.

MR. MILES: Yes. Yes, there is very few and I think we are making the assumption that the program in place for workers that really should be on a program, that there would be some bioassay monitoring that is specific to those exotics in their file, if they really were -- if the program saw a need for that and thought there was a reason for significant intakes, but there should be some bioassay there, and now we are not seeing a whole lot, and there's two answers to that, you know, I mean, possible answers: one, I think is the case, is that it was very rare that a person would have

achieved significant exposure to these and required bioassays.

CHAIRMAN GRIFFON: But you are seeing at least some of it, right?

MR. MILES: We are seeing a few, but not many.

CHAIRMAN GRIFFON: Okay. All right. That's a little reassuring anyway. I thought there was just like --

DR. MACIEVIC: No, it's not absolutely none, but I mean, compared to all the bioassays you have for the other radionuclides --

MR. MILES: But it was campaign-driven, as pointed out, it -- it doesn't -- we haven't seen a lot of those campaigns.

MEMBER MUNN: And the operative word is significant. If -- it isn't -- why would you need to be monitoring for, quote, exotic nuclides, unless they were, for example, in a campaign that was specifically

geared to select them, to separate them for some reason. If they were not, if you weren't aiming specifically for these -- for the lack of a better word, lesser, not exotics, then why should you assume that this one is -- why would anyone imagine --

CHAIRMAN GRIFFON: Well, I mean, the one example we have that Andrew just read out was that it's a neptunium operation and they were doing plutonium bioassay. And you're saying it's not effective -- I think we are circling around a little bit.

MEMBER MUNN: Yes, we are. We are.

DR. MACIEVIC: The next issue is that goes to four where we had -- I had given some examples from the SRDB by neptunium-237 nasal smears in CMR in 1984, and special work permits and there's one in there about neptunium on the work permit.

I mean there's, -- but their --

(Simultaneous speaking.)

DR. MACIEVIC: They are trying and they were looking specifically for that radionuclide at the time, but they are not, you are not, you don't find that large --

MR. MILES: Targeted bioassay is what they call it, with LANL.

CHAIRMAN GRIFFON: What do they call it?

MR. MILES: Targeted.

CHAIRMAN GRIFFON: Targeted, yes.

MR. EVASKOVICH: Let me just add to this, on page 5 of the document I submitted, "At the institutional level, methods used to enrol workers in the bioassay program have not been adequate to ensure that workers are monitored for correct isotopes and at the required frequencies."

This was in the 2098 report for the inspection of the environment, safety and health programs of Los Alamos national laboratory, and that was by the office of

health, safety and security. That's on page 5 of the document I submitted, so you know, and that was a 2008 finding.

MR. MILES: 2008.

MEMBER BEACH: Well, I find it interesting that NIOSH is coming at us with a programmatic approach and then there's tons of examples, even most recently as 2005, 2008, that says the program wasn't what it should have been. So --

DR. MACIEVIC: Well, see but there's --

(Simultaneous speaking.)

DR. MACIEVIC: But the problem is that every site make all of them SEC then, because you can't, I mean, there is no -- I mean, we are not trying to, and that's why -- there's no way we are trying to say that LANL is the epitome of what you have to do to set up a program, and there's holes and gaps and screw-ups in several of the places. But it's

a matter of how much that, for an SEC, is there such a hole that people are getting this large dose that there's no -- that there's no way we can figure out how much this person has gotten that's there in the late '70s, '80s and '90s.

MEMBER BEACH: The dose doesn't really matter though, it's can you reconstruct it?

DR. MACIEVIC: Well, in things like coworker and stuff like that you can. But reconstructing it from detailed, you know, activities for all the years in that, probably not. You are going to have to have some broader brush strokes that cover with a dose that says here's where it is, and you --

CHAIRMAN GRIFFON: I think we've got the questions now. I mean, yes. We are -- I think, leave it at those actions and you've got the thrust of what we're asking.

MR. HINNEFELD: Andrew, the last

part you --

MR. EVASKOVICH: This was from the office of health. HHS.

MR. HINNEFELD: Was that an enforcement, or was that a --

MR. EVASKOVICH: I don't think it was an enforcement. They didn't do any -- they have a group of audits and they've linked their reports back together because they have this 2011 one that basically, it refers back to finding -- it says, "Finding, C8, methods used in LANL tunnel where workers in bioassay programs and compare radiological worker risks were not sufficiently developed to ensure requirements were met. The radiological controls are adequate, as required by LANL implementing support document, ISD, 4.1, in DOE policy 450.4."

So some of them were enforcement issue that I have seen some --

MR. HINNEFELD: I mean, there's an

office of enforcement, health safety and --

MEMBER BEACH: And then oversight --

(Simultaneous speaking.)

MR. EVASKOVICH: Yes, but I have seen --

MR. HINNEFELD: But it may not --

MR. EVASKOVICH: I have seen some enforcement letters along these lines referring to these reports. There have been some enforcement letters referring to these reports.

MR. HINNEFELD: Okay.

MR. EVASKOVICH: I don't remember the specific ones, the dates on them or you know, but I'm pretty sure --

MEMBER BEACH: Did you just send this report?

MR. EVASKOVICH: The 2008 report was --

MR. HINNEFELD: I've got it, I just

can't --

MR. EVASKOVICH: But you know, I raise it as -- it goes along with what Greg said, but I am just saying you know, okay, at what point do you establish the hole is too big, and it seems to me that you are not looking for these radionuclides to begin with, and that has always been my concern. If you are not looking for them, then how do you establish a dose? I mean, you -- it doesn't seem like there's a base, I mean, you could -- because to use plutonium that is generally glove box work, but these other materials are done in fume hoods. There have been incidents where they have been working in fume hoods at CMR, and the other thing deals with, you know, source terms, where do these come from, where were they handled, how are they handled, where did they go to. And I'm just -- I've got the end results with them going into TA-54 as waste, and then you know, the other table that

mentions, you know, when they have these quantities at TA-48, in the safety analysis, they are saying, you know, they are dealing with these, and you know, are they prepared, you know, to deal with them safely to prevent a release to the environment, and that was the purpose of doing the safety analysis at TA-48.

So -- and then when you guys did the evaluation you said well, we are only concerned about these five exotics, and I'm like, well, there's got to be more than that, and that was kind of where this developed from, but you know, I'm just saying, if they're not looking for it, how are they, you know, how do you know whether or not it wasn't a concern or it could have been, because the Sigma incident, they didn't look for the americium before the materials list, it was uranium pellets and they didn't look for americium contamination when it was on there.

It goes over to Sigma, to building

66, he assumes that it's okay, so he didn't have an RCT there with him either, so you know, it's not necessarily how material was handled, but it's how it's mishandled, and I think if you're going to base it on procedures as written, you are going to miss that this stuff is mishandled, and that's where the problems occur.

You know, the whole reason that the americium incident was discovered was because the packaging from the material was in a regular trash can instead of rad waste area. The custodian that was supposed to be maintaining the area was on vacation, and the trash didn't get taken out. RCT saw it in the trash can and said, well, what's this doing here, and then started looking.

Additionally, you know, I have concerns about the monitoring because the gentleman that handled the material, he monitored himself with a hand monitor, you

know, the hand monitor did not detect americium.

But when they checked the hand monitor, they found it all over the handle. So you know, yes, he did use it. But it didn't work. And there have been incidents with that as far as equipment failures and they're listed in the Tiger Team report, and you know, other reports as well.

So, I am just saying at what point -- I think you have to take these into account if you are going to do a dose reconstruction.

CHAIRMAN GRIFFON: I added to the list of actions, just to respond, one additional statement that Andrew made about the other exotics, so just to make sure that the model, whatever --

And I think we, yes, I think we have gone around this a little bit. I don't know, I think it's time to call it on this issue. Can we go on to the next issue?

MR. FITZGERALD: Yes, issue 3 actually is a bit of good news in a way that we touched on, which is the coworker model. When we talked about MAPs, the question there was the accuracy -- sufficiency of beryllium-7 data and the ratio and it all hinges on how that would be applied in the coworker model.

In the coworker models that now stand OTIB-62 doesn't accommodate beryllium per se, but that's one of the issues that you would look at as far as quantification.

You kind of back into looking at the completeness of that relative to MAPs. The MFPs, we did something similar, except in that case you're going to cesium-137 as not so much the original plan, which was to use it as a ratio-based approach, but you are going to use cesium-137 as your substitute.

And we talked about the implications of doing so in terms of things like strontium, whatever. So, certainly we

have mentioned the need to -- I think that's one of the action items -- to look at, you know, how one would address that in the context of the OTIB-62 coworker model, how you would, you know, make sure that that model for unmonitored workers would still work across the spectrum of mixed fission products.

And the third component we just talked about, which was exotics, and I think that figures in it too.

So I think we sort of -- we covered it in each of the -- like we did the checklist. We have sort of covered it in the other topics, so I don't know if there's anything more.

Obviously OTIB-62 needs to be reviewed from those vantage points and whatever modification is necessary, I think would come back to the Work Group.

CHAIRMAN GRIFFON: But it's covered in the actions under the previous --

MR. FITZGERALD: Right. And I think the, the only overriding issue on that particular point from last time was whether there was enough cesium-137 data, and I think your review and the tables you've presented back shows that yes, there certain is cesium-137 data.

So I think that was the remaining question. So I think we are not -- I think we are done with three at this point, because we'll need to -- the Work Group will need to see what comes back, as sort of a new -- in a sense, a new, patched-together OTIB-62 based on those three groups.

CHAIRMAN GRIFFON: And the neutron dose?

DR. MACIEVIC: He loves it, got no problem.

MR. FITZGERALD: I told you he would.

(Laughter.)

CHAIRMAN GRIFFON: It might be okay going forward. We might even meet -- well I know Andrew has got to leave at 3, so we might want to cover --

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: The petitioner issues. Oh, we'll do that in a few minutes. But let's do neutron dose first.

MR. FITZGERALD: Yes, the issue of neutron, actually, we did make a lot of headway in our last Work Group meeting in terms of some of the issues on the NTA film and the fading issue, some of these more traditional NTA film issues, I think we've covered those.

And the real question that came out was the back-extrapolation of the neutron/photon ratios from '82 to the '75 to '79 time frame, and just being reassured that the operations had not necessarily changed during that time frame.

And after killing my printer, printing it out --

CHAIRMAN GRIFFON: Oh, did you?

MR. FITZGERALD: I actually had to stop the printer because I realized what was happening at some point, that I had the entire, the entire history of neutron operations at Los Alamos. I think I cut it off about 1985, but it was already about 100 pages.

So, very impressive tome, you know, certainly pretty convincing that -- he did the operational review. Good stuff. So you know, I don't think there's a lingering problem with not seeing any operational changes that would preclude looking backwards.

The other issue is just making sure that the ratios in general accommodate some of the admittedly wide-ranging, N/P ratios observed at LAMPF, and I think we did address that --

DR. MACIEVIC: And, also, that spreadsheet that I put in there had -- that's based on the NOCTS people.

MR. FITZGERALD: Right.

DR. MACIEVIC: And got as many of the job classifications as you can see, you got the N/P ratios for the different classes, and it would be covered under a distribution for --

MR. FITZGERALD: What distribution are you looking at?

DR. MACIEVIC: Well, I had it in the last review. Well, we're looking at a --

MR. FITZGERALD: And it sort of makes a difference, 95th to the 50th.

DR. MACIEVIC: No, it would be the 95th percentile and you are going to have a distribution from -- oh God, I forgot the number already -- but it will cover all the way up to -- I think you got --

MEMBER BEACH: Is it 5.5 for CMR?

DR. MACIEVIC: Yes, it's going to cover in that range. It will cover between something like 2 up to 12 or 13 in the spread.

MR. FITZGERALD: Look at the spreadsheet and the N/P ratios and for certain job types and for certain facilities, you do get quite a spread. But the 95th certainly takes care of itself.

DR. MACIEVIC: Right, we are not even going to 50th because yes, you do have a spread across the board there. You want to make sure you cover them all in there.

MR. FITZGERALD: So you know, I think it's the 95th of what is in this printout. Now actually, I looked at the mean N/P ratios between '75 to '79 and '80 to '82, just for my own edification, and the mean at 3.58 on this spreadsheet, it goes to 2.17 for '80 to '82 so actually the ratios are higher in the late '70s, but still well within that range of the 95th. So if it's the 95th I

don't think we have an issue.

DR. MACIEVIC: And yes, and the -- no operational changes that I could see going -- things start to occur in the late -- mid to late '80s as operational changes occur. So we are staying within the bounds of where things are pretty much constant -- haven't moved around much.

MR. FITZGERALD: This is from the Fix report but he plots the N/P ratios historically over the history of Los Alamos and there is a jump that you can start seeing in the '80s but not really a jump, but some.

DR. MACIEVIC: But then -- yes, we didn't want to include anything that would be -- start skewing it in the wrong direction.

MR. FITZGERALD: This is the first part of the printout, N/P ratios, '75 to '79 and '80 to '82, and I was playing with that a little bit just to compare the two time frames. But again, 95th forgives all sins as

far as that, so if you go with 95th it accommodates the occupational differences as well as the time frame differences.

CHAIRMAN GRIFFON: So we're probably okay on this one, yes? Yes.

MR. FITZGERALD: Now Work Group Issue 5 --

CHAIRMAN GRIFFON: Is that one closed?

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: We are closing it

(Simultaneous speaking.)

MR. FITZGERALD: Issue 5 has to do with the ponds and this was advanced by a former LANL worker concerned about the aerosolization of what was in the retention ponds at LAMPF, and clearly there was a lot of tritium, nothing else going into the ponds, and their concern was they were in a trailer that was located right by the pond, not a real

good siting issue, and he was also concerned about the beam stop, whether it was getting external radiation but I think the way that was settled was that whatever badging they had certainly would have seen what they would have seen at that point, so really more of an internal issue.

The question was -- and we came very close to getting the pond data at Los Alamos because well -- at the very last minute -- so we didn't get the pond data, and I think the idea was that in your data capture, you do get the pond data, and I think the answer was that you did get some data.

Now the only thing I saw was this one plot.

DR. MACIEVIC: Well, on the tritium that's the one plot.

MR. FITZGERALD: Right.

DR. MACIEVIC: And that the majority is all the other radionuclides that

are in the pond, so you -- they are similar to what you see on the aerosol as far as the radionuclides in the water as well as the air, so -- but to develop some kind of bounding dose toward the pond, we'd have to make up a model for the resuspension, that kind of thing to --

MR. FITZGERALD: Yes, I was going to suggest, it's the only thing I saw as a definitive response, was this plot of concentration versus -- what was it, concentration versus -- time.

What the Work Group might find useful is just the -- what -- what data is going to be used at a certain time frame when these workers, ironworkers, were located near the pond.

DR. MACIEVIC: Mid, late '80s?

MR. FITZGERALD: Mid to late '80s, and if you have that pond concentration data from the tritium, then it sounds like there

would be a model where you would bound the possible resuspension in the air and have an immersion dose, I suspect, some sort, in terms of what they could have possibly inhaled, and that would be -- that would be something that, for workers that were in that immediate vicinity, it wouldn't be very many. This would be something that they would be given as far as a credit for dose.

The reason I raise this, and I am not going to get very specific, is apparently, you know, I don't know how to say this, but you know, in terms of some claimants, they came close but did not get any credit for what they saw as an exposure pathway and that's the reason this came up, was that they felt there was some exposure pathway and we thought there was a credible amount of information that there was in fact some dose coming from the tritium that was being suspended in this pond. So --

DR. MACIEVIC: As you can see though, from the concentration, you are talking, you know, a few millirem possible, from drinking several liters of that water at most.

MR. FITZGERALD: Yes. So I think this would put it to rest in terms of actually a bounding --

DR. MACIEVIC: Right, this is 1986 data also.

MR. FITZGERALD: Yes, that comes pretty close. I think we gave you the specific dates, if not I have the specific dates, but we could put --

CHAIRMAN GRIFFON: You said it's concentration versus time --

DR. MACIEVIC: Over the period of a year --

CHAIRMAN GRIFFON: Concentration of what, in the --

DR. MACIEVIC: Microcuries per

liter I think it is, versus time in the pond --

MR FITZGERALD: In the pond itself.

DR. MACIEVIC: For tritium that they measured and that is -- that comes from the Scott Walker who was the --

MR. FITZGERALD: Right, and we talked to him and we got the sense that the data exists, and it wasn't a complicated issue to know what the source term was at the time, figure out what you could expect the overhead -- they were fairly close to the pond, but even so, you'd have some dilution just being over here rather than on the pond --

CHAIRMAN GRIFFON: So I'm just saying that you identified this data and NIOSH is -- will develop a resuspension model for -- doing exposures from this --

MR. FITZGERALD: Yes.

MR. MILES: And if the answer is millirem, that would be the answer. I mean, I just think that was lacking, some sense about

what the exposure --

DR. MACIEVIC: Yes, the model the -- your data for tritium.

MR. MILES: Well that's the one -- I think that's the one where I looked at the maximum, the maximum concentration in the pond and -- I mean I didn't do a modeling of it, but I --

MR. FITZGERALD: Maybe model is too sophisticated a term.

MR. MILES: I assumed he drank two liters of the pond water and that was less than a millirem of --

MR. FITZGERALD: Okay. That would be even be a --

MR. MILES: That's, I think, I don't know, did you share that -- he took the maximum tritium concentration in the pond and over that entire year --

CHAIRMAN GRIFFON: Maybe model is too strong, like Joe said --

MR. MILES: Drink two liters of it, it's less than a millirem.

CHAIRMAN GRIFFON: Maybe model is too strong a word.

DR. MACIEVIC: We won't --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: That's fine.

MR. FITZGERALD: Without knowing the concentration of the pond, it's hard to answer this person's concern that they were lacking some exposure, so I think even that kind of an answer would provide an answer.

MR. MILES: We're just looking at the 1986 data. That shows the concentration of the pond, right? Is that --

MR. FITZGERALD: Yes, I'll go back and check the dates when these individuals were located but I think --

DR. MACIEVIC: I think it was 1988.

MR. FITZGERALD: That came close, yes.

DR. MACIEVIC: Because I had spoken to the same person too.

MR. FITZGERALD: Right. And they have been very vocal. I said you know, this is something we actually could be able to answer, if we can get the data somewhere, but the data has been hard to come by. It took a while. So if we can provide the answer that would certainly settle that issue out so I would leave it at that.

MEMBER MUNN: Assuming a couple of waivers that would take care of internal exposure.

CHAIRMAN GRIFFON: So is that --

MR. FITZGERALD: That would be item 5. So, almost like a bounding calculation.

(Simultaneous speaking.)

MR. FITZGERALD: I'll go back and check. There's a range of years for --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: We can move on

to the next item.

MR. FITZGERALD: Yes, issue 6 is tritides. The issue there simply is that outside of Mound, Los Alamos is the one that figured with insoluble tritides and the question that came out of the Site Profile review carried forward to the SEC is has been that sufficient to characterize as far as the dose assessment, and I think a while back there was some -- a couple of pieces of information that were in Germantown that spoke to it but you know, frankly, the TBD doesn't say too much, and the question was, is there sufficient information to either discount it as an exposure potential, or propose some, you know, approach where you are going to --

DR. MACIEVIC: Well, we have what is it, TIB --

MR. FITZGERALD: OTIB-66.

DR. MACIEVIC: OTIB-66.

MR. FITZGERALD: It's more of a

source term.

DR. MACIEVIC: Right, going with that, and we reviewed the documents, the classified documents, and there was -- that's, I get the feeling that that would not be an appropriate document to use, TIB-66.

MR. FITZGERALD: But as far as the source term, was there any -- any ability to speak to how -- whether there was an exposure source at the lab? I mean this was -- certainly it exists, but the question is whether it is an exposure source that needs to be characterized in any way.

DR. MACIEVIC: No, it's -- you really can't characterize it well, and -- and I have Bob -- Bob Burns, are you out there?

MR. BURNS: Yes.

DR. MACIEVIC: Would you like to get in on this before I go and blurt out something that I shouldn't say?

MR. BURNS: I don't know if I have

much more to add. I mean, certainly they had tritide facilities at LANL. I guess the facilities where they were doing tritide work, obviously they understand that's what they are doing and they have a rad protection program in place that was hopefully appropriate for that work.

So I guess, to the broader question, was there you know, potential for unmonitored exposures, you know, it seems this issue comes up at every site, and I'm just not sure -- yes, I don't -- whether it's LANL or Sandia or SRS or Mound, I just -- I think we talked about some site-wide approaches to it, but I'm not sure --

MR. FITZGERALD: Yes, this is strictly a source term question.

MR. BURNS: Okay.

MR. FITZGERALD: Because when Mound closed, Los Alamos absorbed some of those activities, and the question is, when you are

dealing with unsealed sources, in terms of handling, you know, is there an exposure pathway and was it one where the personnel were monitored?

I think that's -- that's really the only question, and there is a method to OTIB-66, I'm not -- I think there's a method to deal with estimating the dose, but the question is would that be applied to LANL and why, you know, is there any source that needs to be addressed at LANL. That's how we left it.

And we offered a couple of examples of things we had picked up on the way in Germantown, just as the lead-in. That wasn't meant to be the end-all, but just to sort of give you what we did find in the process as some helpful, helpful information.

So I don't know whether that is something that one can nail down a little better. There were tritide handling

operations. They did inherit what Mound had done when Mound closed in '90, and that's -- the only question is, that doesn't figure very much in any of the characterization in terms of the site documents. Is that something that we don't have to worry about because whatever form it's in, it's not in the exposure, or it's there's no unmonitored exposure, any of the above. I think that was just really kind of an open question that we came up from the Site Profile with, and I'm not sure that really the T was crossed --

MR. HINNEFELD: So it seems like the first question is, was there a dispersible form?

MR. FITZGERALD: It's an exposure potential. Is it the form or the handling that would lead you to say, either: a) there was an exposure potential but it was well monitored and controlled; b) there would not have been any exposure potential because of the form it

was in.

I mean, it's sort of a), b), you know, and just close out the issue. I --

DR. MACIEVIC: Well, I think Bob was taking on the what was there as far as yes, there was some exposure potential but you could quantify it if you needed to by TIB-66.

MR. BURNS: I'm certainly not prepared to say that there was not an exposure potential, to the extent we are -- I don't know to what degree we are able to revisit that or obtain some additional information with our more recent data capture efforts that I wasn't involved in, but as far as what we need to say yeah or nay, vis-a-vis OTIB-66, I don't know if we are there yet or not.

MR. FITZGERALD: Yes, 66, I understand that part, and I don't think -- there's no question it's not a method that can be applied. But you know, how are you going -- it sort of gets back to what we did a little

earlier. When would you decide to pull the trigger on OTIB-66 under the circumstances, or would you, because there is no need to, because there is no exposure potential.

I think that was the loose end on tritides that we had for LANL.

MR. BURNS: But the question of who to assign is --

MR. FITZGERALD: Well, who to assign and any defining -- whether those operations, that they were completely glove-boxed operations, sealed sources -- there's not going to be any OTIB-66 because there isn't any exposure potential per se.

MEMBER MUNN: Say that again. I'm sorry, what was that last sentence?

MR. FITZGERALD: There wouldn't be an OTIB-66 applied because there wouldn't be an exposure potential.

MR. HINNEFELD: That's one potential, is this -- one potential?

MR. FITZGERALD: Yes, that's one option. That's one option.

MR. HINNEFELD: That may not be the truth.

MR. FITZGERALD: Right.

MEMBER MUNN: Right, I understand.

MR. FITZGERALD: And because these are tritium operations, there's always this --

MEMBER MUNN: Got it.

MR. FITZGERALD: Suspicion that you know, tritium, even though tritium is the carrier gas, that you tend to have tritium leaks even from the glove box.

CHAIRMAN GRIFFON: Wanda is raising a commotion to close the issue out --

(Laughter.)

MEMBER MUNN: No, I'm reading OTIB-66.

CHAIRMAN GRIFFON: Oh, okay.

MR. FITZGERALD: No, we are not going to reopen OTIB-66. We're okay. We are

okay with the method so this is really a very -- sort of a site description issue almost, when you characterize it --

MEMBER BEACH: So at the last meeting SC&A recommended that NIOSH look at some documents in Germantown. Did that ever happen?

DR. MACIEVIC: Yes.

MEMBER BEACH: It did happen.

DR. MACIEVIC: They did not give us any indication that there were major problems associated with the tritium.

MEMBER BEACH: That still doesn't totally answer the question.

DR. MACIEVIC: Well, yes, I mean, like you've said, you can't say oh, absolutely, there's no exposure potential here, but that there's not a large exposure potential.

MR. FITZGERALD: It's not, it's not like some of the other issues. This is just a

very, almost like a, maybe if you were doing a Site Profile, you would establish a source term --

CHAIRMAN GRIFFON: Good job of imitation, yes, I -- I mean, if this captures what you are saying Joe, I put down as a followup action NIOSH will follow up on characterizing the source terms, the potential for exposure and who would get assigned dose via OTIB-66. So I think that sort of covers it, right?

MR. FITZGERALD: Yes. Yes. And we are hopeful that those two items in Germantown would at least be helpful in that pursuit, but maybe not, I don't know, it was just a -- it was LANL but I'm not sure it was helpful for that issue.

CHAIRMAN GRIFFON: Yes.

MR. KATZ: Source terms, what was the -- there were three elements to that.

CHAIRMAN GRIFFON: Source terms,

the potential for exposure --

MR. KATZ: Thank you.

CHAIRMAN GRIFFON: What I'll do is I'm putting all these in the matrix but I'll copy out the action items that came from this meeting and just put it in a memo. I think it's a lot easier --

MR. KATZ: Yes.

CHAIRMAN GRIFFON: I'll distribute both. I say all these things and I'll leave here --

(Laughter.)

CHAIRMAN GRIFFON: But no, I'll try -- I'll do it tonight or tomorrow morning. That way I know I'll do it.

MEMBER MUNN: If we update the matrix that would be very helpful.

MR. KATZ: Can we take a 10-minute break, five-minute break?

CHAIRMAN GRIFFON: Absolutely not. Five minutes. Five minutes, because I think

some of might be able to catch earlier flights and Andrew has got to leave at 3. So take a quick comfort break for three minutes, five minutes, and be right back.

(Whereupon, the meeting went off the record at 2:36 p.m. and went back on the record at 2:43 p.m.)

CHAIRMAN GRIFFON: All right. We are wrapping it up. We are down to item number 7 on the agenda. So Joe I'll send it over to you to do 7 to start, and then Andrew is going to --

MR. FITZGERALD: Yes, there's no action, no explicit actions for 7. We did raise -- I kept it in there just for completeness' sake. We did raise some questions about the support workers, the guards, the fire fighters. We noticed in looking at the bioassay data that it actually went down after the early '90 because of a change in regulation 835 and whatever and a

lot of people were actually pushed out of bioassay programs.

So we wanted to raise that originally to you know, to see whether that's going to have any implications for dose reconstruction. I think we covered this at the very first meeting we had. That's why there's no actions. And NIOSH reviewed the database and even though the actual number of bioassays goes down for support workers, it was felt there was enough data, site-wide data to apply.

Now, how that's going to be applied for support workers, I think is still an issue, you know, how, you know, how that cohort is going to be handled as far as coworker model, so that's going to be part of the coworker model. I don't think we got to the specifics with that. So that gets down to you know, how support workers, whether it's MAPs, MFPs, or any of these, would be

addressed if in fact you can't pin them down to any particular location, how would there dose assignment be handled if they were unmonitored, which sort of fits into the coworker issues that we have been discussing.

So more so the fact that they were taken off monitoring for 20 years, but again, this is the last 20 years, not the early period.

So there's a central question of support workers, how they fit in, how are you going to address that in the coworker approach, and you know, how dose assignments would be handled for them whether it's MAPs, MFPs or exotics, that kind of thing. I think that's what this item 7 is.

And I think this sort of, again speaks back to these earlier issues, so in a way, it's part of -- part of those earlier issues.

How's the coworker model going to

treat support workers, fire fighters and security guards in this whole scheme?

CHAIRMAN GRIFFON: The initial -- the action on the matrix, which I don't think we have really resolved, it goes into that -- NIOSH will follow up on the -- on this issue, which was also a cross-reference to item number 3, action item number 2, which basically talked about the -- it's the drop-off in sampling in the later years, and I think it might tie into the technical basis, you know, for the program, in 1990 or so that we talked about earlier, you know, how did they justify dropping these workers off, did -- was there something to tie -- they did an assessment, they determined that the exposures were not likely to exceed 100 millirem, you know, and it's documented here, I mean --

MR. FITZGERALD: Yes, so I --

CHAIRMAN GRIFFON: For the coworker more than bound, I mean, I think you could --

if you put that together then that would answer the question.

MR. FITZGERALD: And that's why we left it at no action. It fits into the actions for these other things, the coworker model, but the coworker model would have to speak to the support workers.

CHAIRMAN GRIFFON: Okay. We can move on to number 8, which is issues specifically raised by the petitioner, and I'll take Joe and/or Andrew --

MR. FITZGERALD: Well, I would defer to Andrew. I think, I was trying to capture, we didn't really spend a lot of time on this at the last meeting so I wanted to make sure it was on the agenda, and if there is anything on this list that you wanted to focus on as far as, you know the question --

CHAIRMAN GRIFFON: I guess we got a specific response on the firing sites --

(Simultaneous speaking.)

MR. EVASKOVICH: This is Andrew Evaskovich. Going off the response document, concerning the firing sites, and you want to use the coworker model at the firing site, I don't see how that will fly because it sounds like, at least from the discussions today, we are talking about glove box workers as opposed to an open area like a firing site where resuspension is an issue.

I'm sure the materials are probably lesser in quantity and concentration but there is no protection for the glove box worker, in the instance of the glove box with negative pressure, you have got people working in an open area with crates and shovels cleaning the area up, and also heavy equipment. So you are dealing with resuspension issues that are different, or you are dealing with resuspension issues and the environment is different than say somebody in TA-4 or TA-55.

And that also kind of goes to

source term issues that I raised at the last meeting concerning the areas of concern or potential release sites, because I don't feel the model is adequate for those areas, especially when there were some areas where either the radionuclides were not quantified, or they were not even characterized at all.

So I don't see how the model could be applied to those when you don't even have any data to base it on, or correlate it to.

DR. MACIEVIC: Well, the -- when you say that the model is based on glove box -- the bioassays that these are based on for the coworker TIB, are based on all the bioassay samples. They are from people who were in glove boxes, not in glove boxes, and all of that working with plutonium.

So it's not like they weren't exposed to -- potentially particular types of contamination. Also, the amounts that you are talking about from the coworker model and

intakes are much larger than would be anticipated from someone from resuspension of dust or digging out a drum that has some resuspension material.

The relation -- you would not expect that a worker, open field, digging in a ditch is going to get an intake of a material greater than what a worker would be getting working with the material, and like I said, they are not all glove box workers.

So this is all the plutonium. So the number you would be assigned is not going to be a tiny number. It will be a larger number than what would be expected for that type of activity.

CHAIRMAN GRIFFON: Can you -- I'm just wondering if it's too much to ask to semi-quantify that. Again, I don't want to say model it, but I mean just do like an estimate, you know, with some information on the firing site, if we did a simple resuspension on this

level, and it's easily bounded by the --

DR. MACIEVIC: Take a look at --

CHAIRMAN GRIFFON: Because I mean I don't disagree with you, but I think we, you know, that would probably --

(Simultaneous speaking.)

MR. EVASKOVICH: Yes, but it's not just the firing sites. It's the --

CHAIRMAN GRIFFON: It's other areas --

MR. EVASKOVICH: Areas of concern and potential release sites because according to the New Mexican environment department they weren't even -- a lot of them weren't characterized. They either don't know what was in there at all, or they don't know how much was in there and those are concerns in the environment department.

So if you don't have the source term, I mean --

CHAIRMAN GRIFFON: And those people

working in those areas wouldn't have been monitored either.

MR. EVASKOVICH: Yes so I don't know if they were monitored or what happened there. I know that the guards were involved in an exercise. I think it was the TA-9 at hot site there, a hot dump. They had them doing you know, an exercise like we do, not physical exercise, but, well, kind of, but you're running, you're prone, you're acting like you're being shot at or whatever, and they found out later it was a hot dump, and in fact we had done -- I had been involved in training exercises in buildings, we were in the building, and then you know, they shut down the training program and said well, no, you guys shouldn't be in there, that's a hot building, we don't know why we let you in there but we've got to stop training.

And that's happened on two occasions and then there was another one where

we were training in a building and there was a beryllium concern which of course doesn't really apply, but still, it's kind of the same problem, along the same lines, as okay, it's an empty building, it's not being used anymore, let's go play, and then we go in there and then oh, after you know, half the guard force or more has been through there, well, we had a problem.

And that's happened.

DR. MACIEVIC: You know, well, the thing is, is if you, you know, something can be considered hot alpha-wise if it's greater than 20 dpm per hundred square centimeter, but that's not going to be a large internal dose.

So we, again, the modeling numbers are very high compared to contamination levels, and when people say buildings are hot, that term is bandied about a lot as to how can mean there's any radionuclide present or there is some contamination present, versus people's

flesh is falling off when they walk into the building.

So I mean you have got that term hot, is not a -- not a good term as far as characterizing the field, and they probably didn't want you in the area because yes, there was contamination in that zone, but not necessarily at a level that would be exceeding what we would give you in that coworker model.

MR. EVASKOVICH: Yes, I understand, I'm just citing those as examples. Going back to the areas of concern and potential release sites that I mentioned last year, I haven't seen any work done on that at all, and my understanding was it was going to be looked at. Response, you know, comes back to, well, same as it ever was.

CHAIRMAN GRIFFON: Well, I think I'll leave, I'll leave the action that way, characterize it -- see what you can do about looking at the model of the firing site and

other release sites, look back at specifics that Andrew put in the petition, and see if we can look at those numbers, because I -- I mean, you know, it's easy to talk --

DR. MACIEVIC: We've looked at sheets but we haven't documented it to show here's what we have got. So yes, we have to.

MR. EVASKOVICH: And the Cerro Grande fire, the White Paper references three air monitors and the one specifically for TA-5, if you look at the report that the White Paper is based on, was not operational for 50 percent of the time during the fire that they cited. I think it's number 23. But it's for TA-5.

Additionally the numbers that you guys are using, they are significantly smaller than the sample -- than the air samples. They are like maybe a tenth of what the other samples were. So I'm concerned about the accuracy of it.

I know that there were issues with the filters getting clogged and I believe there is going to be a gentleman speaking to this at the Board meeting coming up next month who actually did that sampling, and basically he feels that it was totally inadequate for the monitoring. And I think he's going to address that. I haven't had a chance to talk to him yet but somebody told me about this gentleman and maybe I could meet with him beforehand or -- he will be at the meeting.

So those are my concerns there, is just the quality of the data from the air monitors and that's kind of, you know, the environmental issues and stuff, and the resuspension issue I think is a problem because the air monitors, the majority of them are along the perimeter, especially the north perimeter of LANL.

So if somebody was in a field working and there's a resuspension issue, I

don't think that those are going to adequately capture what that person could be putting up into the air.

DR. MACIEVIC: You're talking about the fire?

MR. EVASKOVICH: Yes, the fire.

DR. MACIEVIC: Don Stewart are you out there? Come in, Don Stewart. No, I guess not. Yes, now, he'd addressed -- there were two papers, a White Paper that was done -- a couple of years before, for 2011, we updated that. There was a new set of data based on 2010 survey data from the fire, and Don Stewart redid the calculations using that data, and that is what the model or the calculation that was done with the White Paper.

And that came up to, I forget what the number of millirem, but it was on the millirem scale. It was not a large --

MR. EVASKOVICH: It was taking the

highest dose from those particular monitors for I think americium and plutonium were two of them and I can't remember the other ones. But yes, it's just my question is, how accurate is it.

DR. MACIEVIC: Well, if you --

MR. EVASKOVICH: Power loss issues and the filter clogging issues and stuff.

DR. MACIEVIC: If ,when this person, if you contact this person, if it would be possible to get to the Work Group a -- if this person has published something or has published, what paper has he published --

MR. EVASKOVICH: Well, he was just a worker that did the --

DR. MACIEVIC: Just a worker.

MR. EVASKOVICH: Handled the filters. He was the one that went around and pulled out the filters, I believe.

DR. MACIEVIC: Or if he has knowledge of particular locations of survey

data or something that is giving him his basis for what he is going to talk about that would be good to see so we can compare what we have got.

MR. EVASKOVICH: Those are all my issues or at least that I can deal with.

CHAIRMAN GRIFFON: We've just got this paper recently.

MR. FITZGERALD: The Cerro Grande amendment, yes, we have just received it.

CHAIRMAN GRIFFON: But I mean I -- before Andrew leaves, I would just say let's, let's -- I think we should remind all of ourselves to look back at these issues.

MR. FITZGERALD: Well some of these of course fold into the earlier issues.

CHAIRMAN GRIFFON: Yes, some overlap with --

MR. FITZGERALD: The occupational environmental --

CHAIRMAN GRIFFON: Yes, I think

that's why he skipped that --

(Simultaneous speaking.)

CHAIRMAN GRIFFON: Occupational environmental is covered under the other issues.

MEMBER BEACH: What about the LANL to NTS operations? That was --

MR. FITZGERALD: This is programmatic versus campaign.

MR. FITZGERALD: We talked about that relative to exotics that it's tough to track campaign exposures because they come and go in terms of --

DR. MACIEVIC: Should we, as far as an action item for Cerro Grande, should we say that -- you might get something or maybe see what he's got before we -- because --

CHAIRMAN GRIFFON: Yes.

DR. MACIEVIC: What we have got is this information where we have done our calculation. So if you have something new we

can calculate from or look at --

CHAIRMAN GRIFFON: Well we can't really --

MR. EVASKOVICH: But I don't know if we'll be able to provide any, you know, numbers or data.

DR. MACIEVIC: Or just maybe periods or who did the surveys, that kind of thing, so we can maybe go look up some data.

CHAIRMAN GRIFFON: But, if Andrew can provide that, that's great. I mean we can't really assign this --

DR. MACIEVIC: Well now, we can't assign the task, no --

(Laughter.)

CHAIRMAN GRIFFON: But I will say, I think the ball is in SC&A's court to review the last paper that you provided. So that's an action item --

MEMBER LOCKEY: Have a good trip.

(Whereupon, the meeting went off the record at

3:00 p.m. and went back on the record at 3:01 p.m.)

CHAIRMAN GRIFFON: I mean, do we have anything else on this list? I think Joe, can you just speak to this badge access question before we break?

MR. FITZGERALD: I'm sorry, what?

CHAIRMAN GRIFFON: Before we break up completely this -- the badge access, B under the petitioner issues. I think that was --

MR. FITZGERALD: Oh, I think we actually addressed that. Yes, I think that was addressed. I'm sorry. I probably shouldn't have put that on. That was a question of whether you know, you had to have had a badge in order to be in a particular facility and we went back and forth and I think it was established that no, it wasn't the one for one correlation that the badge gets you in a particular facility.

MEMBER BEACH: Our last meeting we said no further action was required.

MR. FITZGERALD: No further action on that one. That should have been left out. I'm sorry.

CHAIRMAN GRIFFON: Okay. That's all right. I think that covers it. So it closed out. Yes. I think we're done. Is there anything else -- there are only two things I'll bring up at the end here. One is -- well we might --

MR. KATZ: Roman numeral II.

CHAIRMAN GRIFFON: Yes, that is what I'm doing now. I don't know that we are -- it doesn't seem like we are prepared for any recommendations at this point to the Board meeting, even though we are going to be in their back yard.

But I think I'll prepare -- I'm going to prepare, and I'll get Joe's help and stuff to prepare a report from the Work Group

just summarizing where we're at, including some of the -- updating the actions and try to be pretty specific, because I think you know, the -- and rightly so I think we're going to have some questions of where, you know, it's been a year, we haven't heard from you.

So I think we owe them a pretty in-depth update and I hope that NIOSH, that Greg, I don't know if you'll travel to that, or someone will be there to present for NIOSH.

MR. HINNEFELD: Somebody will be there and it might be me.

CHAIRMAN GRIFFON: Or at least answer questions to the extent I can't answer them.

MR. HINNEFELD: It might be me.

CHAIRMAN GRIFFON: Yes, okay.

MR. HINNEFELD: Somebody will.

MR. KATZ: So, are you going to start trying to bring the Board up, sort of educate the Board on --

CHAIRMAN GRIFFON: Yes.

(Simultaneous speaking.)

CHAIRMAN GRIFFON: Give some in-depth background on these issues.

MR. KATZ: More than just sort of status because --

CHAIRMAN GRIFFON: Right. Right.

MR. KATZ: and keep in mind you have two new --

CHAIRMAN GRIFFON: More like we did with the Fernald thing --

MR. KATZ: We have one new Board Member that can interact on this one, but --

CHAIRMAN GRIFFON: That's right.

MR. FITZGERALD: That would be the template then, sort of the Fernald --

CHAIRMAN GRIFFON: Yes, more like the Fernald with a more -- a substantial update, yes.

MR. KATZ: So half an hour? How much time do you want for that?

CHAIRMAN GRIFFON: I've got to talk to you about the agenda too, but we are working on the -- I mean, probably --

MR. KATZ: I need to know times now. That's all, but -- how much time to set aside.

MEMBER MUNN: At least a half hour.

CHAIRMAN GRIFFON: Yes, I would say maybe 45 minutes.

MR. KATZ: Forty-five minutes?

CHAIRMAN GRIFFON: Because I think we are probably going to have some interaction, right? With --

MEMBER MUNN: I would expect.

MEMBER BEACH: And questions.

MR. FITZGERALD: Forty-five minutes.

CHAIRMAN GRIFFON: We don't have to really field questions from the public but --

MR. KATZ: What we'll do is we'll -- we'll do this in advance of the public comment session, so that all the -- so that

folks will be there to hear it.

CHAIRMAN GRIFFON: That's what I was concerned about. Anyway, 45 minutes is good on the agenda, yes. Okay. And I'll send out this updated matrix and condensed version, which will be a memo with additional actions so that you don't have to look through the whole matrix to find these things.

And then I think putting up a new meeting, I think we can wait until the Board meeting to do that, to give us a chance to have calendars there -- all right.

MEMBER MUNN: I guess --

CHAIRMAN GRIFFON: Just to give you guys time to look at these actions and think about by what time are we going to make significant progress.

MEMBER BEACH: My only hope is it doesn't take another year.

MR. KATZ: No, it can't do that.

DR. MACIEVIC: The reason for the

year, I'm going to not believe myself on this one. This was LANL was very difficult to get -- they had budget problems, manpower problems, whenever they would not have the budget problem, then they wouldn't be able to get manpower to get to watch us at the site, so it took us a good six months just to get in the door, to get the type of things we wanted to get.

So I mean it was not a --

(Simultaneous speaking.)

MR. KATZ: No, we understand about problems that arose, but if you could prepare, Stu, at least, so you have a month basically, a little more than a month, but just so that you guys just have the time frame so that we can schedule a meeting.

DR. MACIEVIC: Oh, definitely. Because we are not going to do any data captures or anything like this for this situation, so this is not going to require

waiting on somebody else to --

MR. KATZ: Okay. Right.

CHAIRMAN GRIFFON: It's so ridiculous. I'm still hoping I can make the 3:50 --

MR. KATZ: So we're adjourned.

CHAIRMAN GRIFFON: Meeting adjourned.

(Whereupon, at 3:06 p.m., the meeting adjourned.)