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CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND WORKER HEALTH

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WORK GROUP ON MOUND

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MONDAY,

OCTOBER 27, 2008

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The work group convened in the Frankfurt Board Room at the Cincinnati Airport Marriot, 2395 Progress Drive, Hebron, Kentucky, at 9:30 a.m., Josie Beach, Chair, presiding.

BOARD MEMBERS PRESENT:

JOSIE BEACH, Chair
BRADLEY P. CLAWSON
ROBERT W. PRESLEY
PHILIP SCHOFIELD
PAUL L. ZIEMER

ALSO PRESENT:

TED KATZ, Designated Federal Official
LARRY ELLIOTT, NIOSH ORAU
ROBERT MORRIS, NIOSH ORAU
BRANT ULSH, NIOSH
DON STEWART, ORAU
JENNIFER HOFF, ORAU
KARIN JESSIN, ORAU
BRYCE RICH, ORAU
LEO FAUST, ORAU
GENE ROLLINS, ORAU
JOYCE LIPSZTEIN, SC&A
BOB ALVAREZ, SC&A
BOB BISTLINE, SC&A
RON BUCHANAN, SC&A
NANCY ADAMS, NIOSH Contractor
KAREN HATCH, Department of Energy
JEFF COACH, Department of Labor
DOUG BABCOCK, Office of Senator Sherrod Brown
JOHN MAURO, SC&A
JOE FITZGERALD, SC&A
KATHY ROBERTSON-DEMERS, SC&A
LIZ BRACKETT, ORAU
EMILY HOWELL, Health and Human Services

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

(9:30 a.m.)

MR. KATZ: Good morning. This is the Mound Working Group of the Advisory Board of Radiation Worker Health. Someone on the phone, just let us know you can year.

MEMBER SCHOFIELD: Philip Schofield.

MR. KATZ: Oh, Phil, great. Hi.

MEMBER SCHOFIELD: How are you doing? Good morning.

MR. KATZ: Okay. So, we're just going to start now with introductions of the board members, if -- starting with Josie, the Chairperson.

CHAIR BEACH: I'm Josie Beach, Mound Chair and no conflicts.

MEMBER CLAWSON: Brad Clawson, board member, no conflict.

MEMBER SCHOFIELD: Phil Schofield, board member, no conflicts.

MEMBER PRESLEY: Robert Presley,

board member, no conflict.

MR. KATZ: Okay. And are there any other board members on the phone?

Okay, no problem there. Now, if we go around the room, first with the NIOSH ORAU team, please identify yourself and your conflicts.

MR. ELLIOTT: Larry Elliott, Director of OCAS, no conflict.

MR. MORRIS: Robert Morris, Oak Ridge Associated University Team, no conflict.

MR. ULSH: Brant Ulsh with NIOSH, no conflict.

MR. STEWART: Don Stewart, ORAU, no conflict with Mound.

MS. HOFF: Jennifer Hoff, ORAU Team, no conflict with Mound.

MS. JESSIN: Karin Jessin ORAU Team, no conflict with Mound.

MR. KATZ: And the NIOSH ORAU Team on the phone, please?

MR. RICH: Bryce Rich, I have a conflict with Mound, all ORAU Team.

MS. BRACKETT: Liz Brackett, ORAU Team. I've no conflicts.

MR. FAUST: Leo Faust, ORAU Team, no conflict.

MR. ROLLINS: Gene on the ORAU Team, no conflicts.

MR. KATZ: That was Ms. Brackett if you couldn't hear the first one. Okay, now, SC&A on the telephone.

MS. LIPSZTEIN: Joyce Lypstein, no conflict.

MR. ALVAREZ: Bob Alvarez, no conflict.

MR. BISTLINE: Bob Bistline, no conflict.

MR. BUCHANAN: Ron Buchanan, no conflict.

MR. KATZ: Okay. Now, other federal employees starting in the room, please.

MS. HOWELL: Emily Howell, HHS, no conflict.

MS. ADAMS: Nancy Adams, NIOSH contractor, no conflict.

MR. KATZ: And on the telephone?

MS. HATCH: This is Karen Hatch with the Office of Legacy Management, Department of Energy, Morgantown, West Virginia.

MR. COACH: Jeff Coach with Labor.

MS. AL-NABUSI: Isaf Al-Nabusi, CDOE.

MR. BABCOCK: Doug Babcock with Senator Sherrod Brown.

MR. KATZ: Any other congressional staff? Okay. Then members of the public, please, if you would like to identify yourself, beginning with petitioners.

Okay. And we left off SC&A people in the room, sorry.

MR. MAURO: John Mauro, SC&A, no conflict.

MR. FITZGERALD: And Joe Fitzgerald, SC&A, no conflict.

MS. ROBERTSON-DEMURS: Kathy Robertson-Demers, conflicted.

MR. KATZ: Okay. That's everybody. Then just a piece of advice about phone etiquette. Please, when you're not speaking, if you're on the phone, please use *6, or your mute button, so it doesn't interrupt the discussion in here. Much thanks. And now, please don't put the call on hold. Anybody, if you need to discontinue for a while, please disconnect and call back in. Much thanks. And it's all yours, Josie.

CHAIR BEACH: All right. Thank you. Has everybody got the reports that were sent out starting with the very first one, the Issue 9, ceramic Pu-238? That is where we are going to start this morning. And I'm going to turn it over to SC&A.

MR. KATZ: Okay.

MR. FITZGERALD: Yes, thank you, Josie. I'm going to start it and we have all the internal dosimetrists both in the room, and from -- so, I won't be long on this. But just a little background.

You know, originally SC&A had raised a question about the solubility of high fired plutonium-238 oxide at Mound, as part of our site profile review. I think it's been acknowledged as something that's been understood as being present at Mound. But we felt that the experience with analyzing the behavior of this material at other sites in particular, we have done a review at Los Alamos and certainly, that figured in that review as well, that this was an implication that needed to be addressed as part of the SEC.

And we didn't find that to be the case as far as having addressed in either the site profile, from the standpoint of looking at the implications or in the evaluation

report. So, as part of our matrix review, we highlighted the fact that high-fired Plutonium-238 oxide ceramitized, ceramitized, I think is another way to put it, does exist at Mound, and pointed to some of the analogous studies that have been done in particular in study that was done at Los Alamos, involving eight individuals exposed in an event there, as illustrative of the implications of having high-fired 238 oxide with the low solubility and the kind of behavior you might get, and the complications that presents to dose reconstruction. Now, in this case, we're not making any judgment, or prejudgment as to whether it can be dose-reconstructed, we're just saying that certainly, that behavior would need to be appropriately modeled. And it would need to be demonstrated that you could, in fact, with the right parameters, come up with sufficiently accurate values for those dose reconstructions.

So, in any case, we did receive a white paper in response to that initial flag, if you were, from NIOSH back in, I guess it was July, or maybe before that, even, actually. And what was presented in that white paper was the issue addressed from the standpoint of demonstrating, at least with the data that was available, that their interpretation since the NIOSH ORAU Team's interpretation of that data was that the phenomenon that was observed in the Los Alamos cases, did not seem to be present based on the data that we looked at from Mound.

And that's a very, very short summary of what was a pretty detailed paper. So, just that was kind of the bottom line that we took from there. In our analysis, we wanted to go back and look at the, I think it was 896 -- the urine data -- case data, that was given us by NIOSH. And using that data, do some sampling and try to determine if we

could in fact, as NIOSH interpreted, come up with the same interpretation that, no, you would not see the same kind of phenomenon.

The phenomenon I'm talking about is a lag in terms of seeing the plutonium in the urine, because of it being held up in the body because of the insolubility. And long story short, we'll get into more detail in the white paper. We found it to be at the very least ambiguous, as far as what the data would suggest.

I mean, in some cases, we -- in terms of the samplings that we took, found situations where we could see the same curves, the same phenomena being played out that you would expect if you had highly insoluble plutonium P-238 oxide. And so, what we had come up with in terms of that review, is that we don't believe we can rule it out. And we think there's enough evidence that that phenomenon can been seen when in a number of the urine plots. That we believe

it needs to be demonstrated more.

Again, not coming to a bottom line yet, but we feel that enough cases for demonstrating further, that you don't have the high-fired 238 oxide with the insolubility that we've seen at other sites. Based on this evidence as well, there's some bench-scaled solubility studies.

And this was something that the work group had asked us to look at, which is going back and digging up some of the -- we did some bench solubility and particle size investigations at Mound. And those studies clearly showed that a high fraction in some cases, leaked Pu-238 oxide, was in fact insoluble, class YY or SS, whatever terminology.

We're not using the Type J as you'll see in the white paper, as a nomenclature because again, we're not sure if the behavior of this material at Mound is identical with the behavior at Los Alamos. I

mean, it may be, but at this point, we don't have enough evidence to suggest that. So, we're kind of using, you'll see terminology, we're using a hot -- you know a -- let's see --

MR. ULSH: Type K.

MR. FITZGERALD: Type K, or I think, we also used nonstandard solubility type, something that denotes that, you know, we're not sure exactly what these curves look like, but certainly they exhibit the same characteristics as a so-called Type J that was observed at Los Alamos.

So, I think in general, based on the data points that were provided to us, we've taken this a little further, have looked at it, sampled it, but feel we're not convinced yet that you can't rule out this phenomena. And coupled with the literature and the events that we evaluated, and there was a couple of events for which there is data, we feel there's a fair amount of

evidence that tilts the other way.

So, that's kind of where we came out with this. And at the very end of the piece, not wanting to just present a hypothesis on a problem, but go a little further and say, well, how would you perhaps, this is for the worker's benefit, how would you try to settle this out, being, you know, we looked at the same data, come up with a different conclusion. How could one settle this out?

We identified, I think, seven validation points to say, you know, if one could walk through these validation steps, we believe it would clarify where this comes out, let the chips fall where they may. And the other thing I would say, just to qualify what we reviewed, these data points were not easily interpretable. I mean, you know, the scale that we were looking at, was not logarithmic. So, the first 100 days, which is kind of crucial, we're looking at the lag,

it was really hard to distinguish given the data points.

So, we did the best we could. But I think what it would benefit from, perhaps, the kind of analysis that would focus in on that critical time period following what would be the exposure, the intake, and to look at whether or not you're seeing the kind of phenomena that suggests insolubility.

So, again, we sampled the cases, looked at the curves, found it either ambiguous, or in some cases suggestive of this insolubility class we're talking about. But we also found cases that were suggestive of Type S NEP. So, I mean, I think it's a bit of a mixed bag. That's kind of where we're left at this point.

I would invite Kathy or Joyce or Bob Bistline, our internal dosimetry, sort of, expert group, to chime in each one. Is there anything I left out, or anything you want to add?

MR. KATZ: Just, before you do that, just let the record recognize Dr. Ziemer, who is an alternate member of the work group, has joined us as well.

MR. FITZGERALD: Joyce, Bob, or Kathy, anything in terms of summarizing the white paper? I guess that was a reasonable summary.

MS. ROBERTSON-DEMERS: Well, yes, Joe did a pretty good job. But one of the difficulties that I had when looking at the plots, was that the data was actually gross alpha, and not plutonium-238. And that may explain some of the discrepancy between what we see at Los Alamos and what is being seen at Mound.

MR. FITZGERALD: And we're still, just to add a little bit more to that, looking at the radio-chemistry of gross alpha in sort of another venue on the issue of weapon. But this comes up in a number of places, and we, you know, this question of

whether one can discriminate through gross alpha over that time period, is a technical question that we want to unpack a bit more. And we're preparing yet another white paper, which we're hoping to have in your hands probably in a few weeks.

So, these are connected, and this is another implication of the connection to this paper issue as well. It may add to some of the discrepancies, but I don't think it is the dominant issue. I think we still are looking at these curves and saying that we're seeing some evidence that there's insolubility at least from the data we looked at.

CHAIR BEACH: Joe, you said the white paper, that's on Issue 11, correct, that you're --

MR. FITZGERALD: Right. Right.

CHAIR BEACH: -- you were just referring to? Thank you.

MR. FITZGERALD: And we reference

that in some of the other issues that we're going to talk about today.

CHAIR BEACH: Right.

MR. FITZGERALD: But that's not quite done. And we hope to get that to you as soon as possible.

MS. LIPSZTEIN: Joe, this is Joyce Lypstein. I think you've summarized very well everything that is put actually on the preliminary response white paper. And I think what is very important is, and we've agreed, key questions to our problem, is if NIOSH is capable of recognizing exposures to this special case, such as Plutonium-238 exposure with this solubility of Plutonium-238 exposure.

From their white paper, they did not recognize the presence of Plutonium-238. And we are dealing with -- it's very difficult to recognize it. But we have some evidence that there was exposures to both special solubility kind. So we come out with

something like that, we have pushed it through expected NIOSH risk analysis that weights exposure to this special Plutonium-238.

And second, how are they going to recognize both the exposure cases? Because even if it's possible to build a model for this special solubility type of Plutonium-238, it has to be a model that is better for use for mild exposures. Weak, mild, is different and then the desirable states from the evidence was the publisher, from Sheehan and Woods, describing, telling the incident. Benefitted to this, benefitted to find it in Mound. The model doesn't fit exactly like the way Mound, Los Alamos that incident.

And this might be another incident. This special solubility type of plutonium would behave differently. So, we'd have different times from when the mistake happened, and one that you can see it on your NIOSH expression. So, after

recognizing who were the people that were exposed to this special type of plutonium, then NIOSH has perceived -- it can be built, a Mound model for this special solubility type of Plutonium-238.

So, first NIOSH tests must state that they had the ability to see an update, and which workers were tagged with the model applied, and which model to apply to the different kinds of incidents that might have happened at Mound. But it's not a simple case. It's a very difficult case. And it came up just, you know, applying for Mound and applying the model from Los Alamos to Mound and without knowing who were the people that were exposed, and how this dosage behavior, this special solubility to type, and at Mound.

MR. FITZGERALD: Yes, I think -- this is Joe again. I think Joyce is pointing out there was a comment that -- or, actually it was addressed in the NIOSH ORAU white

paper, where it was indicated that if one were to find incidences of low solubility, high-fired Pu, you could in fact apply the Type J, Los Alamos model as an upper bound for those exposures.

I think one thing that we point out in this white paper of ours is that that may be fraught with some problems in the sense that there's other issues that come up in terms of the actual compounds that were being used at Mound, and that's one reason more to use the Type J as the handle for what we're seeing at Mound that may be different. That's one aspect of it.

And the other thing I think Joyce is pointing out is, sort of going downstream a little further than I did, but if one were to acknowledge that the phenomenon does exist, then there's a need to model it. And I think one thing we pointed early on in this process is that we do not presume or prejudge that a model could not be developed. In

fact, we think it's -- as it has been done at other sites, and as it was done at Rocky Flats, a model can be constructed.

But I think maybe the first step is to validate, you know, since we have different conclusions on the same data, that, you know, whether the work group and NIOSH would agree that you were seeing some evidence of this and then validate what exactly are we seeing. And then maybe go beyond that to, can one bound this, or model this and exactly what would that model look like if all the implications that Joyce is raising would be pertinent to that?

So, there is a path on this. I mean it's, to borrow John's expressions, I think it's tractable. But you know, again, I think we're at the stage now where we both have taken a good look at the data, and we have you know, different conclusions. But I think there still is a path where we can actually validate and converge on something.

CHAIR BEACH: I do have a question, Joe. On the matrix, the updated matrix, under Issue 9, under Other Comments, the last comment was, particle size is important to the assessment of these radionuclides since you can get different doses for different particle sizes. Can you explain that just a little bit? I mean, I understand the difference in particle sizes, but --

MR. FITZGERALD: Well, I think it just gets to the inhalation is a default 5 micron, I believe, that's used. It's a question of characterizing whether you're dealing with something different than that default that -- in these situations. And where this comes most important, is with the -- what the heck it was called -- the plasma torch --

MR. STEWART: Microspheres.

MR. FITZGERALD: -- of microspheres. I think there's certainly not

history there where you're dealing with very, very small particles, fume-size particles which would present a different respiratory issue. So, there is varying particle sizes, we think, in that -- in the operational work place.

But I think that's an issue, I think Joyce was kind of hinging on that. When you get to, okay, you agree one, high-fired exists, two, that it exhibits properties that would suggest heightened insolubility, then if there's agreement on those two things, then the next thing would be okay, how do we actually model this, bound it, or whatever. And then, I think particle size becomes more of its parameters. Because I think that effects, you know, the model, or the -- whatever approach you would take.

And I think for the plasma you know, plasma torch, that would be a different parameter than say, the different part of the operating line. And there's been some

studies. And the insolubility study it looked at the bench -- it looked at both the solubility of Pu-238 as well as well as particle sizing. So, there's certainly some data.

Now, whether it's good operational data, we haven't gone quite that far. We're still a little up stream right now.

CHAIR BEACH: Thanks. Ulsh, did you want to?

MR. ULSH: I'll start out -- this is Brant Ulsh. I'll start out and just kind of give a big picture of this issue as I understand it. And then perhaps let Liz Brackett who is on the phone, get into some of the more -- some of the details. Liz has much more expertise in internal dosimetry than I do.

Just briefly, in terms of development of this issue, as Joe stated, SC&A raised this concern, and we took a look at it and issued a report in advance of the

previous Working Group meeting back -- I don't even know when it was, July?

CHAIR BEACH: July 14th.

MR. ULSH: And SC&A issued their response to that report a couple of weeks ago. We have had a little bit of time to take a look at SC&A's report. We were not able to finish up a response to that report. We certainly will by the time of the Working Group meeting. But perhaps I can cover some of the main points of what our response is likely to be.

The reason this issue was raised, I think, and I'll let Joe jump in if I mischaracterize it, but one situation where this type of material was recognized is known as the Wing 9 incident at Los Alamos. That incident involved a situation where, inside an inert environment, inside of a -- I don't want to call it a glove box, because it's not. It was an isolated chamber.

They were cutting open an RTG, a

radio isotopic thermal electric generator. Basically, that is a power source used for space probes. And one of Mound's main missions was to produce Plutonium-238 power sources for the space program.

So, one of these power sources was being cut open, disassembled inside of an inert environment at Los Alamos. A couple of situations led to exposure of personnel of this material. Number one, they were cutting it open with a torch after the power source had been subjected to severe vibration testing.

And what that vibration testing did, was it ground a lot of the plates, the ceramic plates together, and generated respirable-sized particles of this material. And also, it was fairly fresh material. So -- and that's important for a couple of reasons that if I remember, I'll get into a little bit later.

The thing that led to the

exposure, though, was an accident on the glove ports to this chamber. The actual cutting was done inside the chamber and there were some glove ports, and there was a leak. And a couple of other events, positive pressurization inside the chamber, led to this material being ejected into the environment where workers were present, and so they inhaled this material.

And it was an unusual type of Plutonium exposure in that it was a non-monotonic excretion curve. So what that means is, immediately after the incident, you didn't see any Plutonium in the urine. Over time, the excretion peaked, and then declined. And that's pretty unusual.

And the point that I think that we want to make, is that this is a very unusual exposure scenario. It's not common. It's not even typical at other places like Mound, for instance. Again, the vibration testing generated the respirable particles. And

there was certainly vibration testing done at Mound. I mean, that is certainly true.

But the situation where this thing was being destructively analyzed, in other words, cut open, and workers were being exposed to this material, is not typical at Mound. So, we have looked at the 896, I think, cases, as Joe mentioned. And we did not see evidence of the type, solubility class, solubility behavior that was observed at LANL, in the Wing 9 incident.

Now, SC&A has referenced a paper by Woods and Sheehan. And we have looked at that too. And the data in that paper also does not look like the type of material, the type of solubility behavior that you saw at Los Alamos.

There is, however, evidence in that paper of non-monotonic excretion. In other words, a slight increase followed by a decrease, but it is not the same as was observed at LANL. And Liz, you fact-check me

here, but our other internal dosimetrist, Tom LaBone, has looked at the particular cases observed in that paper, and they're very well modeled by standard ICRP models that we use. So, I think that we're okay there.

I do think that it would -- this issue would certainly benefit from further analysis in terms of, we'll be issuing the response to SC&A's report. We don't see evidence of the Type J. That's what the LANL material has been called. We still don't see evidence of that at Mound.

We do see this kind of non-monotonic behavior in the Woods' paper, certainly. But we don't think that it presents the same kind of a challenge that the LANL material would present. Liz, would you like to take it from there?

MS. BRACKETT: Yes. I would just like to make one minor correction. It's not necessarily accurate that we think we can just use the standard type M and S. It's

just the paper was written specifically to address Type J. And that's what we feel was not present at Mound.

What SC&A has called Type K, which I think we need to change that, because we've already used Type K for uranium aluminide modeling. But --

MR. FITZGERALD: L?

MR. ULSH: We'll just take it --

(Laughter.)

MS. BRACKETT: We need to keep a matrix of what we're calling these types. But, we do agree that it does not behave as the normal -- the standard type. But it looks like Type K's, the initial dissolution rate, where J is about 1,000 days for that base locate initially, this other type, that was seen at Mound is about 100 days before it peaks. And so we do feel that that is not that difficult to model. And it would certainly be detected sooner than the material that was seen at Los Alamos.

And so we do feel that it can be modeled adequately, maybe you know, with some changes to the model. But not with the difficulty that the Type J presents.

MR. FITZGERALD: Liz, this is Joe. Does that present those confounding problems on a practical level in terms of monitoring the workplace by -- you know, again, I don't know what bioassay frequency would have been done for Pu, but monthly is what sticks in mind. Is that right?

MS. BRACKETT: It's probably quarterly or annually.

MR. FITZGERALD: Quarterly or annually. And you know, I'm wondering if there's any implications for you know, picking up what I would call events or instances, sort of acute exposure versus chronic. That's usually a bugaboo, if you have some of these situations.

MS. BRACKETT: Well, personally, I don't think that it would present a problem

because you're monitoring, routine monitoring, is likely to be longer than when you do the peak. We could look at the variation it would present between, you know, assuming the standard midpoint for an acute intake, then look at doing it within the time between samples to see how much of a difference that makes for this particular type.

Although, for most cases, we assume a chronic intake. You know, if there are no clear peaks in the data, and no identified incident, and particularly for people whose results are less than the detection limit, we just assume a chronic exposure. And there's no reason to assume anything different for these people. You know, because we're just looking at general intakes on that.

It's just, you know, that's the default. If we don't know anything else, then we go with chronic. Because it can

approximate several acute intakes. So, I don't think this presents a problem. Although, we can certainly look at that.

I believe that Tom might have done some calculations for that already. Unfortunately, he wasn't able to make it to the call today. But I think that he started looking at that already.

MS. LIPSZTEIN: Liz, let me understand. So, you were recognizing that there was exposure to this type, solubility Type Plutonium-238 at Mound and that the model currently can be -- you can model it, and it's a different model than the Type J that was presented for Los Alamos. Right?

And that, not only this accident, what described at Sheehan, but there might be other cases at Mound that had the same behavior. And you have to look at the urinary excretions and see what's the best model for Mound. Is that it?

MS. BRACKETT: Yes, that's correct.

MS. LIPSZTEIN: Okay. So, I think we are on the same pages. I think what SC&A would like NIOSH to show is how they are going to recognize which people were exposed to this special plutonium solubility type and how it's going to be modeled, and to who it is going to be applied, if it's possible to recognize it.

MS. BRACKETT: Well, at this point, initial thought on that, I think that in many cases, since a lot of pre-trial progress on the detection limit, for many people, we would, at least for those cases, propose that, given no other information, that this would just be another model that we would try for the person to see if it was -- if it resulted in a larger dose than M and S. And so, it would just be another, another type that we would try when evaluating a case.

Certainly, if we had more data, then we could try to do an evaluation of what

it possibly was. But I think for many cases, it would be just another option for the dose reconstructor to try.

MS. LIPSZTEIN: And do you think if there was an different kind of incident, you could have another model, could have several models and probably would have to have a bounding model?

MS. BRACKETT: Well, do you mean incidents where we have bioassay data, or --

MS. LIPSZTEIN: Yes, where you have bioassay data and you didn't recognize at first that it was exposure to this special solubility type, but now you see that it might -- that might have been exposure like that?

MS. BECKETT: Yes. Well, in such a case, we could use the data for the individual to look at it. But -- is that what you mean?

MS. LIPSZTEIN: Yes. Because within, you know, I'm worried about this

first -- okay. I understand that you would look again at everybody, at every person, and look at their possibility of exposure to this special kind. And then see which has been most great, and safest model; Type M, Type S, or this special solubility K1, let's say.

But the problem is that, not for every case, K1 would be applied, it stems from the incident.

MS. BECKETT: Right. If there -- if the individual had enough data, that would take -- make such determination, then certainly, we would do so.

MR. FITZGERALD: Yes. I think in general, I'm hearing, and correct me if I'm wrong Brant, it sounds like Liz, what you're saying, is you've moved to considering this model, whatever letter you're going to assign it, which has this -- which acknowledges it's nonmonotonic behavior, that may involve 100-day lag, rather than a sort of 1,000-day lag that we had with the Los Alamos Type J.

And you're going to look at, you know, how that plays with the data that we have, what are the implications. And I think what Joyce is saying, there seems to be implications of, where you know you have different classes, you might have high-fired that would presumably exhibit this.

I assume you would assign this to all high-fired, or not? I don't know if you've made that review or not. Have you? Or, is that something that's still in the air.

MR. ULSH: I think we probably haven't made that review just yet. Certainly what you said earlier about the plutonium microsphere program, obviously that's the type of a process where you might see that kind of a thing. But I come back to once we get to a point of agreement, where a model has been proposed, and everyone buys off on it, then the question of application of that model is no longer -- it's not an SEC issue.

It is a TBD issue.

At bottom line, I mean, if -- and I'm, please understand, I'm not proposing this, but it could be applied to everyone on site. It's a question of an application. It's not a question of can it be done. That is a TBD issue.

MR. FITZGERALD: Well, this is a good point. I think we raised this early on with respect to the modeling and concept. Remember that whole -- we kind of had that early on as an issue, which meant that -- and I think we said this from the get-go. That we felt that conceptually a model could be arrived at. And I remember you sort of jumped in, well, it's all kind of, the SEC issue is over.

Well, no, actually, we actually felt that you had to demonstrate that on a realistic or practical level, you can build parameters, and you know, you can distinguish who was exposed, and the things I think Joyce

had mentioned. You know, be able to feed the model, such that you could come up with dose reconstructions. And I guess, maybe that's a more generic question.

But you know, if one can come up with a model, is that the end of the road? Or is, does one have to demonstrate the model can be applied? If it can't be applied, because you don't -- you can't, say, figure out who's actually subject to that model, then that kind of defeats the purpose of the model.

So, I guess from our standpoint, it's yes, one needs to be able to come up with a model. But demonstrating that it can be used, and with sufficient accuracy, seems to be the other test under the SEC that, you know, if it can't be used, or you don't have the parameters that would enable you to use it, then I think that would fall short in being an implementable model.

MR. ULSH: Well, I --

MR. FITZGERALD: That's kind of where I think what we're coming from.

MR. ULSH: Yes. We might be using different terminology, talking about -- passed each other a little bit.

MR. FITZGERALD: Maybe.

MR. ULSH: When I say that we reach a point where everyone agrees that the model can be developed, a model has been developed, and we've shown that it bounds the types of behavior that you see at Mound, at that point, then the SEC argument is over.

CHAIR BEACH: You still have to connect the workers to that model.

MR. FITZGERALD: Right. That's what he --

CHAIR BEACH: And I'm wondering how that's going to happen.

MR. FITZGERALD: You use the model to demonstrate -- to take a look at maybe these 896 cases, or a subset of them, and show that, with the models that are

available, including Type K1, or L --

CHAIR BEACH: K, L --

MR. FITZGERALD: -- or whatever we're going to call it, and the standard ICRP models, one of those models adequately bounds those exposures. And perhaps, I mean, I don't know, this is down the road, when we look at you know, what kinds of processes would generate this possibility of exposure to this material, what time frames, that kind of thing, that those kinds of things are TBD questions.

Like I said, at bottom, if we get to a point where we say, at worst, we could apply this to everybody on site. Now, I don't think that we would do that. Because number 1, it's not going to be claimant-favorable in all situations. But if we get to a point where we say, at worst, that's as big a circle as it could be.

Now, maybe we can narrow that

circle. Maybe we can say, people who were monitoring Plutonium-238, or during a specific time period, or with these cancers and these specific organs, it's possible that that circle could be drawn tighter.

But once you find a point where you've demonstrated that this model in addition to the others, bounds the types of behavior that you see at Mound, we're done from an SEC perspective. Of course, all those other issues, when you would apply this, those are important issues. And they're appropriately handled under the context of the TBD issue, at least, that's our position. It's for the Working Group to decide that, though.

MR. MAURO: Can I throw a -- from a precedent point of view, this is not unlike the situation we encountered in the past when we have a uranium exposure, and we have to make -- well, are we talking about Type M or Type S.

And very often, NIOSH would say, well, we're going to use the one that gives the limiting dose. And the reason now, that's certainly claimant-favorable. But there's one little aspect to it that I think is important to acknowledge. Is that there's also this issue I keep running across, is a plausibility.

That is, the SEC requirements also say, not only be claimant-favorable, but you need to be plausible. And the reason --

MR. MORRIS: And they are a member of that cohort.

MR. MAURO: In other words --

MR. MORRIS: -- or any member of the plausible for any member.

MR. MAURO: Right. So, for example, when we were working with Chapman Valve, there was some uncertainty regarding whether we're dealing with S, or M or some kind of mixture. And it became plausible that any one of the exposures these people

experienced is tough to tell. And it's not out of the question, that what may be the right way to deal with this is, when S is limiting, that's what we'll use. When M is limiting, that's what we'll use.

And it's certainly claimant-favorable and plausible. Because the nature of the material was such that you could not -- you -- it was not -- it was plausible that it could be either one of them. So, in that way, it almost, fit the definition of plausible.

Now, what they're doing is now you're moving into this realm, and in this realm we're saying, well they have different names for it. Now, we're going to call it a Type S, versus this other type. To me, it's the same thing. But it's a new one because ICRP doesn't really, maybe, talk too much about it. But -- and you've come up with a solution. Okay, let's agree that there are certain biokinetics that we observe that seem

to be, don't fit the nice little clean boxes that ICRP creates for us all.

And we got a new box here, and we want to give it a name. And also, we all agree, that given the data that we do have, sitting down, we can probably construct a biokinetic treatment of this problem to model that situation when we encounter it, for that person. So therefore, unless we all walk away and we agree, yes, we can do that person. We've got enough data, and it certainly has this lag, and we'll come up with a model for that person. Okay.

Now, here's where I'm headed. Where I'm headed now, is good, I think we've got that locked. So now we have a coworker model problem. The problem is, well, we have people out there who are below the limits of detection. We don't know quite for sure what circumstances under which they might have been exposed to the plutonium, and we're confronted with the dilemma of whether we

treat that person. Whether we -- you know, let's say we have limited measurements, or no measurements above the detection level. But we do want to assign some missed dose to that person.

And now what I'm hearing across the table is, a good solution is, well, use the one that's limiting. And that's very much analogous to what was done in other circumstances. Now, this is where the plausibility issue comes in. And this is how I see it.

If it's plausible that the nature of the material that was being handled across the board at this facility was such that it's an unusual material, and it's possible that many of the workers might have been exposed to this unusual material, we're not sure. So therefore, it's plausible that everyone might have gotten that. It goes back to the Chapman Valve again. We really don't know because of the nature of the operation, the

nature of the material, all of a sudden -- the argument I'm making is that, yes., if it seems that it's plausible that that scenario could in fact be the case at this facility, then you could say, it becomes universal. We will always pick the one that's limiting.

But, if it turns out that you can't really say that, you say, well, no. It's not like that. There's only a certain class of workers that we believe were exposed to this -- had this unusual pattern. And the other classes of workers clearly were not. Then we're in the SEC realm, in my opinion, where we're going to have to parse the two.

We're going to have to be able to say, each time you have a person that's on the table, where you don't have clear and unambiguous data, where by you can do dose reconstruction either way, but you're saying, we have to make a choice. What are we going to assign to this person, which box are we going to put it in? What I'm saying is, that

automatically assigning into the limiting box, will work if it's plausible that he might belong in that box.

But if the nature of his work, you know, if it turns out the nature of the work is such that no, no, no, you should be able to make that distinction. The nature of the work was different enough, that you can say, these people are going to be Type M, and these people are going to be Type S, to harken back to other situations where you did make -- where you are sort of like forced to make that distinction.

I guess, if you see where I'm going, it almost is a question that goes to the Working Group and the Board, about plausibility. We're going to run into this time and time again on future -- and now, the question really becomes, what I'm hearing, is you folks have proposed, given that the signs could be dealt with, we'll come up with a biokinetic model just like we did on Rocky.

It can be done here, why not. Okay? And so, in principle, yes.

Then the question becomes, on Rocky, I think you were in a situation where you could make a distinction between those workers that you felt you want to treat with high-fired, and those you decided no, we're not going to treat with high-fired, or not.

MR. ULSH: Actually, Rocky, it was --

MR. MAURO: It was everybody.

MR. ULSH: It was everybody. It turned out not to be the claimant-favorable choice sometimes. But it was, as a possibility, it was applied to --

MR. MAURO: Okay. Well, situation. So maybe it was, at Rocky, you had a circumstance where you're saying where you have all these workers, but you're going to assign high-fired to all of them, even though that may not have been limiting. And not only that, it may not be the scenario

that applies to that person.

MR. ULSH: No, no, no. It was at Rocky, what we did was, we added that to among the universe of possible solubility classes.

MR. MAURO: Okay.

MR. ULSH: Of everybody.

MR. MAURO: Okay.

MR. ULSH: For some people, it turned out to be the limiting choice.

MR. MAURO: Okay.

MR. ULSH: For others, it didn't.

MR. MAURO: Okay. And you made that distinction.

MS. BRACKETT: In fact, that's pretty much across the complex now. Once we develop this super S, that's done at all the sites.

MR. MAURO: Good. But now, that brings us right where we are, the only reason I bring this question up. And the reason I bring it up is we're here again, only on

Mound with a new type of material, with it's own biokinetics. And it sounds to me that once that model is agreed upon, which I believe there's general agreement it can be built, how are you going to parse it amongst workers?

The universal approach may not be the one that will be what I would say consistent with the plausibility assigned it. It's just a little too convenient. Okay, we just give it to everybody. You know, everybody's got the worst possible scenario. I don't know if you can do that. And this is really a judgment to be made by the Working Group and the Board.

You know, because you found universal solution that will bound everybody, but if that circumstance does not apply to everybody, is that consistent with the plausibility side?

MR. MORRIS: But John, it doesn't have to apply to everybody. It has to apply

to any member of the proposed class.

MR. MAURO: Right.

MR. MORRIS: Not every member of the proposed class. That's the definition of --

MR. FITZGERALD: But it won't be in the proposed class if it'ssuccessful. I guess I'm missing something.

MR. MAURO: Maybe I'm not making myself clear.

MEMBER ZIEMER: Well, the proposed class can have any number of definitions. It could be everybody on the site, or it could be in a particular building, or a particular class of -- that's going to be very dependent on the definition of the class to start with.

But I don't think Brant was saying you're going to apply it across the board in a site, are you? You yourself define what the class is.

MR. MAURO: Well, the initial Mound -- initial proposed Mound class is

everybody on site. Now, of course, as in the past, the Advisory Board is free to, perhaps, define a narrower class. I mean, that's always a possibility. But right now, at least the initial proposed class is everyone on site.

John, where I'm perhaps a little confused is, even at Rocky Flats, it may not be possible to say that these particular workers dealt with Super S Plutonium-239, and these particular workers didn't. I certainly think that it's not -- the people that were actually exposed to that material is much smaller than what we're applying it to.

MR. MAURO: See, if you know who they are, I think you've got the problem knocked. In other words, I know that the people that were in the circumstance where they were exposed to this unusual material, we know who they are. And therefore, we know when we're going to apply it.

I'm more concerned about not being

able to do that.

MR. ULSH: But that's not what we're doing at Rocky. We're putting that in for everybody. I mean, there's precedent for that. And as Liz said, it's not just Rocky. It's pretty much across the complex.

MS. BRACKETT: In general, for internal dosimetry, the way it works is that we take the possible universe of material types, identified by the ICRP, and we apply all of them to every person. I mean, we can't say with any certainty anywhere that these people only work with Type M, and these people only work with Type S. The dosing conceptions are always done assuming all possible material types.

MR. ULSH: Now, it may be at Mound. Keep in mind, I'm getting ahead of the cart, ahead of the horse here. I can't really say where, if any, situations -- well, certainly there are some situations at Mound. I think that everyone one would agree where

you see this nonmonotonic behavior. That might be limited to a particular time.

For instance, when they started the microsphere program. I'm just saying, a for-instance here. I don't know that that's the case. So, you might say for instance, whenever that program started, I don't know when it was, 1965, I don't know. Before that time, it's not plausible. After that time, it's plausible.

There may be situations like that.

MR. MAURO: You just answered my question. There might be ways to parse this.

MR. ULSH: Perhaps.

MR. MAURO: And it depends on, I guess, it's uncertain right now.

MR. ULSH: Perhaps. But of course, that would be something that we would all have to discuss, and you know, come to consensus on, I guess.

But at worst, we're left with a situation like at Rocky Flats, and everywhere

else in the complex, where we say --

MR. MAURO: You can't parse it.

MR. ULSH: -- we can't parse it. Just apply it to everybody.

MR. FITZGERALD: I guess my question that sort of led into this discussion was, whether that parsing was going to be part of demonstrating the model, or from the way you describe it, as part of the non-SEC application part. And I'm still not clear whether you would agree that the kind of parsing that -- I'll use that word that John's talking about -- would be part of your demonstrating the model, how it would be applied.

If it is, then my issue doesn't play. If it isn't, then I still have some questions about whether the model is going to be truly demonstrated if you can't show how you're going to distinguish workers.

MR. ULSH: Perhaps the way forward would be, from here, let's wait and see how

it all shakes out. If we wind up proposing, you know, what, we're just going to apply it to everybody, well, then that's one thing.

MR. FITZGERALD: Yes. Okay.

MR. ULSH: But if we come back and we say, it's only these particular workers, maybe then that would be the appropriate time to have that discussion. Do we need to talk about this now, before the SEC decision is made? Or is that more appropriate for a TBD discussion.

MR. FITZGERALD: Well, I think that discussion can't be -- I mean, you've had the response now for at least a week. I'm just saying, it really is pretty early in the process.

MR. ULSH: Yes, yes.

MR. FITZGERALD: But I think a discussion can happen the next go around.

MR. MAURO: And talking it through, and listening, I can see why we would come to the decision it's not an SEC.

Because what you're saying is, once you have the model, then it becomes, okay, well, we're really in one or two places.

Either if we really can't parse it, that means that we really don't know who really got this and who didn't get it, then you have no choice but to apply it to everybody. If you can parse it, you can parse it. So, I guess I'm going to sort of withdraw my little concern after my -- after thinking it out loud, so-to-speak. I guess my reaction now, in light of what you said is that, yes, we're not really dealing with an SEC issue.

MR. ULSH: Well, it's early. Let's -- certainly I like that.

MR. MAURO: No, no, no. I'm just trying to be thoughtfully honest about it. Because my first reaction was, wait a minute. You have an obligation to parse. But maybe if you really can't parse it, I mean, just about anybody could have gotten hit with this

stuff.

MR. ULSH: Yes.

MR. MAURO: Then you really, like everything else, like the uranium issue, then you have no choice than to pick the worst one for each person.

MS. LIPSZTEIN: I think that's why we stop now, is that it has to be looked -- all the people that were exposed, that had bioassay focus done, and see which ones would have been exposed to this special Plutonium-238 type, solubility type.

And how is NIOSH going to do it, to distinguish which workers would have this specific model, so that -- because I think we are weighing that even exposure to this special type of plutonium, depending on the year, and on the circumstances, the model could be different. So, you would have different -- let's say, it's not -- what makes the model different is the assumption parameters. So, the assignment of the

assumption parameters, to the different cases and different years that the incidents might have occurred.

So, what NIOSH has to demonstrate now, is how it's going to, NIOSH is going to distinguish who could have been exposed to this special type of Plutonium-238, and which model is the best one to be applied in each kind of incident. And which incidents occurred, and what shall be done if you have insufficient data to determine which form of the threat was involved.

And also, how to distinguish from the bioassay data, what was Plutonium-238 and what was Plutonium-239. And there are some hints, if you go through the DOE files from the workers, that might be some exposures to the high fired Plutonium-239 also, which has what -- like in Rocky Flats. So, it's tricky to distinguish. I simply -- what I would like to do is wait for NIOSH response to tell us how they are going to distinguish

who were exposed to this special kind of Plutonium-238, how to distinguish from the bioassay from the Plutonium-238 from Plutonium-239, which different models are plausible to apply with Mound, which is the most claimant favorable, and what should be done if you have insufficient data to determine what kind of Plutonium is involved.

MR. ULSH: Joyce, I think we might be shooting at the wrong target here. You're focusing on the importance of picking Type K1 versus Type S. I'm focusing on looking at the bioassay data that is available for a particular claimant, and showing that using some model, either the predefined ICRP models, or this K1 model, that we can bound the dose. I can't say whether it was really perhaps K1 or Type S. But I can show at least with one model, I can bound, I can come up with a claimant favorable estimate of the dose for that particular worker.

That's the end point that we have

to show. I don't think --

MS. LIPSZTEIN: Yes. But there might be a K1, K2, K3, K4, depending on the case.

MR. MORRIS: Do you really think there would be that many different models, or do you think that's just --

MS. LIPSZTEIN: I don't know. I don't know.

MR. MORRIS: -- individual variability that's --

MS. LIPSZTEIN: I don't know. We have to look at the data. I don't know. It's clear --

MR. MORRIS: All I'm suggesting is that that's --

MS. LIPSZTEIN: -- now -- it's split judgment. I know that in different times, probably there was exposure to this special solubility type. Because we have the incident described by Sheehan and Woods, and then we have later, if you look at the DOE

worker statement files, there's even some notes saying that at a much later time, saying that the results don't -- well, they said for example, "His early data was lower than later. And before he couldn't calculate amount initial by the present to show the early movement of material to be high enough."

The same problem is found with workers such and such. So, in several places in the DOE files from the workers, there are some notes pointing to this kind of exposure in different times. So, I don't know if all of them would fit the same model. But this is something that has to be done. I'm not saying maybe it fits the same model, maybe not. I didn't try.

MR. FITZGERALD: I guess my question would be, from what you and Liz have said, you're going to look at the data. The Sheehan paper, just for -- well, it's a comment paper. It's one set of data. You're

going to be looking at samples of 89, so you're going to be looking at some of the plots that we kind of sampled.

I mean, you're going to look for, I would assume, not a series of so-called K curves, but maybe a bounding K curve that would best characterize the Mound behavior, nonmonotonic behavior? I mean, certainly you could come up with a series, but that would seem to be inefficient and impractical. You would try to come up with a bounding, I would think. Is that kind of where you're headed?

MR. ULSH: Liz?

MS. BECKETT: Well, we do have all of the Mound plutonium data. And I'm pretty sure that we've identified cases there that we could use to look at a model for those, for those in the Sheehan paper. I'm thinking that there are one or two other papers published on Mound data but I'm not positive.

But, yes, we would look at that whole sort of universe of data, not just

looking at the Sheehan paper.

MR. FITZGERALD: And so you would probably be looking to figure out what the most conservative model or curve would be, although, you could also, you know, identify maybe sets of curves. But that would -- again, that would be a choice of what makes the most sense in terms of the operations and the cohorts involved.

But I think -- Joyce, is that what you're kind of saying? That really, we don't know, and I guess NIOSH doesn't know at this point either? But that strategy is something that I think Brant used, that that's what we've got to come back with. It's after we go through this, think about it, and what's the best approach. And it may be one bounding upper curve, or it might be a couple curves. And it's hard to know at this point.

MR. ULSH: Yes. What I might propose to do is, that once we finalize our response to your report, do any additional

data analysis that we talk about, and decide we need to do, include that in there. Perhaps this might be a topic that would benefit from one of these technical calls, you know, that happens in between Working Group meetings.

MS. BECKETT: And getting Tom involved would be very helpful. Because he's more familiar with the data than I am at this point.

MR. FITZGERALD: Yes. I think that would be good timing, you know, whatever time you need the model to have to get together and talk.

MR. ULSH: Talk to my people and find out.

MS. ROBERTSON-DEMERS: This is Kathy Demers. I just wanted to bring up a couple of things that you have to keep in mind in developing this model.

You don't have to identify people necessarily for the application of the model,

but you are going to have to identify people who were exposed to this material when you develop that model?

MS. BECKETT: Yes.

MS. ROBERTSON-DEMERS: And another thing that concerns me and this kind of adds to what Joyce said about Plutonium-239, is that this is gross alpha. This is not Plutonium-238. And you have to take that into consideration. Because you're getting other actonides coming through.

MR. ULSH: Certainly, that's the case, Kathy, where there is a reasonable possibility that they were exposed to other actonides. There were certainly limited situations at Mound where there was work with other actonides. But by and large, those pale in scale to the work that was done with Plutonium-238. And I think that if we identify people who say, for instance, were involved with the uranium program, or working with the thorium redrumming effort, that

would certainly be an issue where we might want to consider not using those people.

But far and away, the biggest mission was the Plutonium-238. So, I think that -- I mean, the reason that they got away with using gross alpha as opposed to a isotope specific model, was because it was fairly easy to differentiate if you see a result, kind of you pretty much know what material it's coming from.

But, I understand your point. I mean, if someone is working with multiple radionuclides, they may not be the best person to pick to develop the model. That's certainly true.

MS. ROBERTSON-DEMERS: And the other difficulty is that because this stuff is so insoluble, you're going to have a lower excretion rate. And you may fall below the MDA, and there may be a higher MDA that you have to apply to the situation because of that insolubility.

MR. ULSH: Liz, do you have any thoughts on that?

MS. BECKETT: No. Why would there be a higher MDA?

MS. ROBERTSON-DEMERS: Because it's showing up -- you're seeing less of this type of plutonium in the urine than you're seeing other types of plutonium.

MR. ULSH: Well, the MDA wouldn't change that. It's the intake that you might miss, might be.

MS. BECKETT: Right. But that doesn't affect the MDA.

MR. MAURO: Yes. It's what you got -- you've taken a urine sample, you don't see anything.

MR. ULSH: Right.

MR. MAURO: And you know, if that was above whatever, one becherel per whatever, you would see it. Now, so you're saying, okay, it's one-half that. We're going to assume it's one-half, or whatever

your standard protocol for assigning missed dose. Then the question becomes, do we assume that material that the person took in that would have given that, is that this high-fired stuff, or the regular stuff. And that's -- and we're right back where we started from.

And you were saying, hey, push comes to shove, we just assign it the worst, whatever the worst assumption is, we will assign it to that person, depending on the organ of interest. And I guess when I -- the more I think about it, the more I think again, my opinion is it Working Group? My reaction is, that's not an SEC issue. Because you're basically saying, we have a way to bound it.

It's almost like to say -- in fact, we are avoiding this a little bit, Plutonium-239 versus 238. You might be in the same circumstance. You could say, well, we could do the same thing there. You know,

push comes to shove, we just make the worst assumption if you're looking at gross alpha. I mean, we've done that with enrichment.

For example, at -- we'll be talking about this at Fernald. We don't -- in some cases, we don't really know an enrichment level of uranium people were exposed to. It could have been anywhere from natural up to perhaps two percent, perhaps a size ten percent is some unusual circumstance.

And some judgment was made, we'll be discussing this matter, of what our default assumption's going to be universally, universally to everyone, of what the enrichment level was. Same thing goes with the recycled uranium. We're going to make some universal judgment that everyone gets a certain parts per billion of plutonium, even though we know it's not true. But we're going to make a certain judgment and apply it universally from the beginning to the end.

So, in effect, what we're dealing with is a -- I guess a philosophy of dose reconstruction that says that, when you're really not sure, in other words, if you're not really sure how you're going to parse it, in other words, okay, what are the people that got this unusual, what are the ones where it didn't? And you what, when push comes to shove, we have real trouble doing that.

We're not quite sure. Especially, when you're dealing with a bunch of people that have low limits of protection, you don't have curves for them, you don't know what to assign to them in terms of what form they might have been working with. What I'm hearing is, well, the default of the case that gives him the highest exposure.

That's almost like a universal policy that's happening over and over again. Would that be a fair representation of the philosophy that's been adopted here?

MR. ULSH: It's early.

MR. MAURO: Okay.

MR. ULSH: It may very well end up being that. If we have strong reason to say that this particular solubility type is not an option for these particular situations, and the example I used earlier was, if we said it only happened in 1965 forward --

MR. MAURO: Sure, absolutely.

MR. ULSH: -- then we might say it's not --

MR. MAURO: Sure.

MR. ULSH: -- for the earlier time period. But I -- it's possible that we might say, everybody across the whole complex. I just don't know yet.

MR. MAURO: No, no.

MR. ULSH: I guess, across the Mound facility, I just don't know yet.

MEMBER ZIEMER: A question to either Brant or Liz, when you're doing your modeling on this, do you have -- are you

assuming a particle size distribution, or do we have actual data? Is this mining for microspheres?

MR. ULSH: Paul, I'm going to speak, and then let Liz correct me, because I'll probably go wrong. But my impression is that when you're dealing from urinalysis data, the particle size argument is really irrelevant. It's only when you're trying to go from air data. Liz, am I right, or am I overstating it.

MS. BECKETT: I think it can certainly make a difference on, depending on what the range of possibilities is.

MR. ULSH: Okay.

MEMBER ZIEMER: I think if you want to back calculate the organ doses, you may need to know what that distribution was. Liz, is that -- am I thinking about this correctly? You get a certain output.

MS. BECKETT: Right.

MEMBER ZIEMER: Let's say you know

that it's plutonium. And you have to represent an organ dose for a given, if you're reconstructing at least, you need to know a distribution from the lung, which is particle-size related.

MS. BECKETT: Yes. I think it takes a pretty broad variation and particle size before it actually makes much of a difference. But I don't know how much data, just off the top of my head. I was just trying to quickly go through some of the things that Tom wrote to see if he looked at this at all.

MEMBER ZIEMER: Well, I was trying to get a feel for Joe's point on the fumes. Intuitively, you feel like that's a really much different kind of particle size distribution, although I don't know that. Do you know?

MR. FITZGERALD: Well, I'm sort of where you are, in the sense that fumes would certainly, I think, challenge the fallout

assumption of fine microns. But I --

MEMBER ZIEMER: Well, I don't know that.

MR. MAURO: Change the submicron.

MR. FITZGERALD: We haven't seen -- I haven't seen actual measurements of the fumes. But I think in general, that's understood. And again, I think that's an implication, you know, in terms of that operation.

MEMBER ZIEMER: Given output in urine for that, if what you're saying is true, it seems to me would look very different than if you had the pretty big particles and things were being swallowed and taken back up the escalator and out the stomach and --

MR. FITZGERALD: This would not likely to be --

MEMBER ZIEMER: Yes.

MR. FITZGERALD: -- exhaled at the chronic state.

MS. ROBERTSON-DEMERS: Well, what we do have is, we don't have the measurements for fumes, but we do have some measurements for Pu-238. And the range was 1 to 10 microns.

MEMBER ZIEMER: Air measurements?

MS. ROBERTSON-DEMERS: What they did was, they took a cascading factor --

MEMBER ZIEMER: It seems to me things would be very different than that.

MS. ROBERTSON-DEMERS: Yes.

MR. FITZGERALD: I'm not sure they did in fact, you know, it depends upon what time frame.

MS. ROBERTSON-DEMERS: Well, they could --

MR. FITZGERALD: Because they used a plasma torch a certain time frame, if they didn't take the air samples then, it probably wouldn't be included.

MS. ROBERTSON-DEMERS: Yes. They were not doing that when these measurements

were done.

MR. BISTLINE: Paul, this is Bob Bistline, and at Rocky, I know the differences between one micron and five micron, I can always calculate it to be about a factor of three difference in dose calculation, because of particle size.

MS. BECKETT: But is that starting from a bioassay result, or starting from an intake? It makes a big difference.

MR. BISTLINE: That was taken from an intake.

MS. BECKETT: Right. And we're starting from bioassay. So, it's --

MEMBER ZIEMER: It may be less than that.

MS. BECKETT: This whole project has been a lesson in --

MEMBER ZIEMER: Yes.

MS. BECKETT: -- intuition. Because I'm usually wrong when I try to think it through without doing the calculations.

MS. LIPSZTEIN: Yes, but you've been starting from urine excretion and you are calculating to go through the lungs, so the particle size would make a difference.

MS. BECKETT: Well, for lung in particular.

MS. LIPSZTEIN: Yes.

MS. BECKETT: But that's not necessarily what we're --

MS. LIPSZTEIN: Yes, but in the state of Plutonium-238 there would be, going to be a large dose in the lung, that you are going to calculate it again.

MS. BECKETT: And I thought, I was looking at something earlier, and I thought that there had been a study that said that the particle size was five microns. But maybe that was just an isolated incident.

MS. ROBERTSON-DEMERS: It was an average. The range was 1 to 10.

MS. BECKETT: Okay.

MR. FITZGERALD: And that 1 to 10

doesn't include the, necessarily some fumes from that one operation.

MS. ROBERTSON-DEMERS: Yes. This was for in the D&D era.

MR. BISTLINE: How about during the, when they're actually processing? Because in the process handler, they had different particulate size of the 238.

MS. ROBERTSON-DEMERS: That's what we don't have the data for. We haven't found it. All we have is data for what was done in the D&D era.

MR. BISTLINE: Okay.

MR. ULSH: I know that I have seen data on particle sizes but I don't remember the particulars, when and where and so I can't really speak to how representative it is. If this is an issue that is a concern, we will take a look and see what kind of data exists on particle size.

MR. FITZGERALD: Yes. I think the way we left it when we first brought it up,

was that would be part of what you would kind of consider in terms of parameters for the model. I don't know how that plays either. But I think at Mound in particular given the different ways the oxide was handled, the different techniques, it seems like you have a much broader range of particle size than some other sites.

I think, I can think of fumes, it would be submicron.

MEMBER ZIEMER: Yes. No, I --

MR. FITZGERALD: I don't know what the implications dose-wise would be for that, but certainly that would stretch it.

MEMBER ZIEMER: Well, I think as they do the modeling, they could easily test the model to see whether that made much difference in the bottom line.

MR. FITZGERALD: Yes.

MEMBER CLAWSON: But, I'm sorry, I don't want to show my ignorance here. You're telling me that it is not an SEC issue?

CHAIR BEACH: Not yet.

MEMBER CLAWSON: But if you can demonstrate -- okay. That's what I was -- if you can demonstrate the model. But if you can't apply it to the people?

MR. ULSH: I think it's too early to say that it is or is not an SEC issue. Until we come back to the table with a strategy for saying, we have a bounding model, and then at that time, we might or might not have to discuss to whom it is applied.

MEMBER CLAWSON: Well, and this is what I was trying to get a clarification. Because you made a comment, and was very sure that this is not an SEC issue, because we can do this model. And if we can do the model, that's great. But if we can't apply it for the people, then?

MR. ULSH: Well, there were a couple of preconditions there when I said that.

MEMBER CLAWSON: Right.

MR. ULSH: And that is, that we come up with a model that can be added to the universe of possible solubility classes, where we can show that we can adequately match the bioassay data from the people at the site. Then it becomes -- and if we try to say, that we're going to apply this particular K1 model to a group of people that is smaller than everyone on site, it's only going to be limited to a smaller subset.

At that time, we might have to have a discussion about okay, is this a TBD or an SEC issue? But we're not there yet.

MEMBER CLAWSON: Okay. I just -- I was -- I'm just having a hard time getting around that. I apologize.

MR. ULSH: No, that's fine.

MS. ROBERTSON-DEMERS: There was two other things on this issue. The -- we originally talked about when we brought up the issue of high-fired oxide, one of them

was high-fired uranium oxide. And as of right now, we haven't found any data indicating that it was present at Mound. And unless we do, we're okay with closing that issue.

And the other one was high-fired thorium oxide. And we have decided to defer that to the data adequacy write up.

MR. ULSH: So are you saying that will come in under Issue 11?

MS. ROBERTSON-DEMERS: Yes.

MR. ULSH: Might I ask, when you're talking about uranium, you said you hadn't found any data yet. Are there other places that you're planning to look? I mean, where are you in terms of -- I mean, are you still looking at the data?

MS. ROBERTSON-DEMERS: Well, if it comes up, then we'll --

MR. FITZGERALD: I think, yes. We, you know, we've been -- would be all at the site probably three times.

MR. ULSH: Yes.

MR. FITZGERALD: I think we probably have done everything we can dig out now. I think all we're saying is that unless something presents itself, this is closed as an issue for this particular item.

But we're leaving it open if something does arise where there's some evidence that you know, you both have the high-fired process and the uranium present, and that would be an implication. But I guess in the big sphere of things, it just wouldn't be anywhere near the magnitude of the plutonium.

So, all we're saying is, in terms of that issue, to close it out. We didn't find anything. We think it's a legitimate question, but you know, again, uranium did exist at the site issue now, but we haven't found that connection between high-fired processes and uranium in terms of exposure potentials. So, you know, we looked, got the

data, looked for the data, but haven't found anything that demonstrates that.

So, we're parking it, not pursuing it any further unless something comes up that would make the case. Thorium as an issue, I think, is a broader question of just being able to see it adequately in terms of monitoring. I think that fits into 11.

MEMBER ZIEMER: I just want to make my usual remark here. And guess what it is? And that is, if that's an issue, and there's some evidence that you see that there is, I think it's NIOSH's job to pursue the issue. It's not our contractor's job to be looking for that information. It's fine to keep your eyes open for it, you know.

MR. FITZGERALD: That's the context.

MS. ROBERTSON-DEMERS: Yes, that's --

MEMBER ZIEMER: But you know, pulling the string, ultimately, goes back to

NIOSH.

MR. FITZGERALD: Right.

MEMBER ZIEMER: If there's indicators along the way that this is an issue, then I think we want NIOSH to say, this needs to be pursued. So the contractor is not doing NIOSH's work.

MR. FITZGERALD: No. Just a little history in context. When this came up as part of the overall issue on Pu-238, we said that certainly, there's a good possibility other high-fired forms may be involved. And I think Brant's response at the time to paraphrase was, that we have seen no evidence.

And our response to that was, well, we're going out to Mound to do records retrieval, and keep our eyes open. And if we do find anything, we'll pursue this issue further. This is sort of an acknowledgment that no, we haven't found anything.

So, we're letting it go, unless

something else comes up. So, no, we certainly aren't doing extensive research. But in the process of data capture, we were kind of looking to see if there was any uranium or thorium data in this context. We didn't see any. So, this is more of a status acknowledgment.

MR. MAURO: Before we move on, I was -- I am thinking and troubled by this question of parsing. And I gave you an idea, it's a thought problem. Let's say we were all -- we all worked at Mound, all of us, okay? Same year. We all worked there. And we also know that one of us, worked with this special type of material, one of us. Not all of us, just one of us, but we don't know who it is.

Okay? Now, we're dealing with this dose reconstruction. Well, if we don't know who it is, well, we'll just assign it to everybody. Okay? Is that -- does that meet the threshold of plausibility and

appropriate, as a strategy for dealing with this class of problem? Since we know it was one, but we don't know who it is, you understand?

And I would say, my reaction would be, no, that's not there.

MR. MORRIS: Well, my reaction is yes.

MR. MAURO: But as it is the question --

MR. MORRIS: In first fire, maybe we should defer with a lawyer on our a staff to answer the question. If I want to go back to the definition, it's not -- it has to be accurate for every member of the class. It has to be for any member of the class. And you know, I think you have to make a careful read of that.

MR. MAURO: I agree. But I think that in thinking of it that way, sort of a crystalize the issue. In other words, and that would be a judgment call, or a legal

call. So right now, I don't know the answer to that question. But I think that's the way to think about it.

MR. MORRIS: I'm not sure, again, that we might be using terms differently. Under the scenario that you have set up, where the data doesn't exist, or we don't have the data that would let us say, John Mauro was the guy that was exposed to this material --

MR. MAURO: But we do have the data that says, only one person was.

MR. MORRIS: Okay.

MR. MAURO: Because it was such a small amount.

MR. MORRIS: Right.

MR. MAURO: You know, or such a short period of time.

MR. MORRIS: And if we don't have the data to draw a tighter circle than that, to say, particular workers were, or were not, in other words, we're saying it's plausible

that anybody at the table could have been exposed to that material. Then I think we're obligated to not assign it but enter that as one of the possible universe of solubility classes that we would consider.

MR. MAURO: I can understand you coming down that side. I'm not sure.

MR. MORRIS: And consequently, it is plausible. And therefore, would meet the definition.

MEMBER CLAWSON: Now you guys are starting to get into my realm of it. You could walk into the whole thing and say, I'm going to give this much, and we'll throw it to everybody now it's plausible. There's also another little bit in there too about accuracy and integrity of data. And that's where I start to get into some of the problems with this. And I understand where you're going with this and so forth, but I already have a hard time getting my hands around it.

Because of course, both, we're sometimes on both sides of this whole issue. But where does it come down to?

MR. MAURO: Where does it end?

MEMBER CLAWSON: Where does it end, you know. And granted, when you read the law on this thing and what they're saying, I don't think that we're really hitting on it. I think we're sometimes on either side of it. And it's very vague to me. And I hate, I hate documentation like that.

But, what it comes down to is, the plausible part of it, you could throw out a number out there, and if I'm not mistaken, you could throw it out there and say, hey, that will take care of everything. Then it gets back into the integrity, the data, and everything else like that and if it really is plausible for it. And we've had the discussion on several sides, so.

MEMBER ZIEMER: Well, let me take

the counter-argument. Throwing a number out there is not the approach. What number is used has to have some basis in reason and science. And the accuracy part, you're talking about an accurate decision on compensation, which is different than an accurate dose assignment to an individual. You've have to be accurate in the decision to compensate.

And that often means, if you want to talk about individual accuracy, because of this unknown factor, you have the ten people John's talking about, you're going to be inaccurate on nine of them scientifically from a dose assignment point of view, but you will be accurate as the law defines it, in making the determination of eligibility for compensation, which is what we need to be accurate about.

Because actually, I think NIOSH has shown that in general, the less -- often the less we know about a person's dose,

you're left with the less accurate, yes, the more likely they are to be compensated because of the fact that you have to assume some possibilities for that. Now, that's not always true across the board. But I've taken the numbers with student groups and have them plug it in. The less -- the bigger that unknown distribution is, the more likely you are to reach the POC level at 95 percent.

MR. STEWART: I just want to add to that a little bit. When you have a very detailed work history, and a lot of bioassay data, then you are able to estimate an accurate dose. Which, in our universe, typically means a lower dose.

MEMBER ZIEMER: Now, because the spread is tighter? That 95 percent count, that interval doesn't move way out?

MR. MAURO: But to go back to lose -- you use the word tension, it always exists. I like to -- we have an interesting tension. Because it is, we will all admit,

that if we do know that it's only one person that got the high dose in this room, but we don't know who it is, and then we decide within the context of the rule, it's appropriate to apply that higher dose to everyone.

But then I would take the next step and say, however, we'd also agree that it's not plausible that every single one in the room got that does. So, there's the tension. We have a dilemma.

MEMBER ZIEMER: I think we have to look at it the other way. Is it plausible that any one of them could have. Not that all of them did. I think you got to ask how you're saying plausibility. We don't know which, is it plausible for you yet, plausible for Ted yet. Okay?

MR. MAURO: That's good.

MR. KATZ: If I could just point out, in the dose reconstruction rule, Part 82, it actually specifies as an example

solubility that NIOSH would select. The most claimant favorable solubility when there was uncertainty about the solubility. So it really, it's actually called out very clearly, in those dose reconstruction rules as an approach.

MEMBER ZIEMER: But the final numbers that are derived, although they may not be accurate, have a basis, not just a number, that you know, let's pick a big enough number and we can cover everybody. It's got to be some rationale for it. And we've had some arguments about what's rational. I think sometimes that SC&A has said that number is not only real high, but it's not rational.

MR. MAURO: It's off the charts, yes.

MEMBER ZIEMER: And sometimes it's the other way around. I mean, maybe NIOSH's number is not high enough, or something.

CHAIR BEACH: So, is there

anything else on this issue we want to -- in keeping with the agenda, it's break time. So, 11:00, what time is it now? Is it 11:00 now? Okay, 11:15.

(Whereupon, the above-entitled matter went off the record at 11:12 a.m. and resumed at 11:14 a.m.)

MR. KATZ: This is the Mound Work Group of the Advisory Board on Radiation Worker Health. And we're about to get started again following a short break.

CHAIR BEACH: Okay. Thank you, Ted. Our next item is the SC&A Review Summary Notes regarding exposure sources at non-rad buildings at Mound. And I am going to let Joe introduce this topic.

MR. FITZGERALD: Yes. Thank you, Josie. Bob, are you -- Alvarez, are you on the phone?

MR. ALVAREZ: Yes, I'm here.

MR. FITZGERALD: Okay. Where this all came from, just a little background, is

in the matrix, we identified a issue that we tend to look at for each, SEC, which is the degree to which there's a basis for assuming that the most highly exposed workers were in fact the ones that were badged.

And this stems from the -- in some cases, I'm not saying this is the case with Mound, but in some cases, in the early years, that wasn't necessarily the case. And we do want to examine that issue as a starting point.

And in the case of Mound, I think the issue was, we could not find a formal basis for the badging policy. Again, I think the statement or the assertion in the ER is that the history, operational history at Mound indicates that in fact the most exposed were badged. And we wanted to see something that was a firmer basis for that indication.

And I think the response that we received early on, was that you know, the contemporary accounts, how business was done

in the early days, you know, the Meyer reports, and whatnot, was wrongly suggested that in fact, people were badged and that the -- where you had radiological areas, that was a requirement to go into those areas, was in fact, to be badged.

And we looked at the documentation, did not find any formal policies, but did pick up on I think the same operational perspective, that they did define these radiological areas and were stringent about requiring badging of people entering those areas.

In this course of this discussion, we indicated that we would keep our eyes open in our records review to in fact, find any policy, or any evidence that there was an approach or a procedure of badging workers. To date, we still have not found that. But in the interim, I think the Working Group, I forget where the suggestion came from, but the Working Group suggested that SC&A review

the available documentation to see if there were any evidence, or any situations where facilities considered to be "nonradiologocal," did in fact get -- were demonstrated later to have contamination that may have exposed nonbadged workers.

And that was the task that Bob Alvarez took up, which was to look at the available documentation to see if in fact there were these so-called nonradiological facilities in which nonbadged workers may have been exposed to radiation, just as an additional factor to look at on this discussion.

So, Bob, do you want to explain? Bob? MR. ALVAREZ: I'm still there. I may have to move to the other ear here. Good morning.

We were asked to take a look at four different buildings: Buildings 48, 89 M and DS. And these were considered to be non-

nuclear buildings at the Mound Laboratory. A preliminary review of various documents, and I assume you have a copy of the firming notes that I prepared, looked at these buildings to determine whether or not there might have been potential exposures to radiation going on, either during the period of historic operations or during the closure period.

Those -- I guess the most significant and intriguing building is the DS Building. This building was constructed in the 1960s. It's about 47,810 square feet. And it was known as the Development and Standards Building. And it was not considered to be a nuclear building and had sort of carried out several functions. It was "a complete standards laboratory for measuring and calibrating the latest optical, electrical, mass-dimensional and environmental systems."

In the 1980s, the building was involved in explosives component development

standards and in the 1990s, almost all the DS Building submissions ceased, with one exception. And then later on, during the closure period, probably beginning in the mid-90s, the building was used for administrative offices, change rooms, clothing distribution, bioassay sample collections, container distribution, a break room, document storage, respirator training.

And it was considered to be, that the deactivation's building would be considered minimal because it did not handle any radioactive material. The -- in looking at this, what caught my attention was, in 1997 radiological survey of the Mound -- a baseline survey of the Mound buildings, and that this particular building had a considerable amount of contamination from removable tritium in 36 out of some 100 rooms.

I think there were more tritium samples collected in this building than all

the other rooms. Contamination was found on furniture, in store cabinets, on equipment, a computer monitor, floors, desks, drawers, benches, trash cans, a door handle, and a supply bin. And that one reading was as high as 2.9 million DPM per 100 cubic meter of allocation.

The survey indicated the DS building had the largest number of removable loose tritium examination surveyed, greater than 1,000 DPMs, of all the buildings that were a part of the survey. This included the radioactive -- the nuclear building, particularly the SW and the T building. It also appeared to have the largest number of tritium samples above the DOE control limit for removable contamination, which is 10,000 DPM.

Now, how this -- how and when this contamination came about is a mystery. And there may be several explanations. I'm just not sure. The DS Building was built directly

atop of the T Building, which processed significant amounts of radionuclides for several decades, including tritium. And that there, according to the structural process as the history of the DS Building, there was a, along the front of the building, a "high risk line from the T Building extended from the eastern and western sides of the building." And that the southern face of the T Tower formed to face an interior wall of the D building. So, it was what it was.

The -- also in the late 1990s, the T Building was involved in the unloading of tritium bottles from 1995 until the late 90s. So, there was some activity that went on during the closure period there. There was one sample that they -- they found a Plutonium-238 sample on a cabinet that was higher than the DOE control limit. And they found the DS Building had three times as many readings for total alpha contamination in excess of 100 DPM than the T Building for

example.

The Plutonium-238 was found about 30 times greater than DOE for essential contamination where there were transuranics. And in my memo, you see, that I took a look at the number of samples. There were about 50 samples for loose tritium contamination taken in the DS Building that were above 1,000 DPM. Only 32 samples were in the SW building and six samples in the T building.

This -- there may be several explanations for this. I just am not sure. But as this is something which I, it was suggested NIOSH take a closer look at. It's possible that this building might have been contaminated during the period of historic operation. We don't know. It's possible it may have been contaminated during the closure period either by people tracking in contamination or failure of the radcon program. We don't know.

Although, I found that to be a

hard one to accept because of the pervasive contamination in so many rooms, and the high levels of contamination in so many rooms that were found. Or, it might have occurred in the, during the closure period when the T building was involved with processing tritium bottles. We simply don't know.

And we don't know how many workers worked in this building during its historic operation, how many workers were in and out of that building during the closure period. Whether or not the workers were routinely monitored or not, we don't know. During any of these periods, I -- it's just a mystery; this, in my opinion, perhaps the most significant issue that needs to be looked at by NIOSH relative to potential contamination of non-nuclear building.

The second building was building 48. This was built in 1970, and it appears that it did not handle or store any radioactivity -- radioactive materials prior

to 1999. And there might have been some legacy contamination, associated with a waste line break near the building, involving polonium and cobalt-69 -- or cobalt-60, rather.

A 1996 rad survey indicated radon contamination where equipment was found. This is prior to their having them -- the contractors brought in radioactive material. After 1999, when environmental health physics sampling laboratories were established there. Building 48 stored and analyzed samples for plutonium, thorium, uranium and tritium.

In 2001, there was an incident involving tritium that affected several rooms. Contamination samples were taken from four drawers that ranged from 10,592 DPMs to 208,000 DPM. I looked at the non-radiological characterizations. Their report of 1997, and contamination was also found in room, in an additional two rooms. A "high-

direct alpha reading was found in a vent in room 205," and according to surveys, a max of total reading of 205 was 382 DPM alpha, and 500 -- something under 5,000 DPM beta.

Building 89 was built in 1985 and served as a detonator storage building. The 1996 site life characterization noted that readings in room 101 were described as radon. According to the 1997 baseline characterization, room 101 was maximum total contamination from alpha and beta activity of about 1657 to under 5,000 DPM respectively.

They found samples from a sink that contained alpha activity, which the survey indicated was "still contaminated due to radon." A belt guard was found to have 3,000 DPM alpha. In March 2000, tritium contamination was discovered in rooms 101 and -- 119, I'm sorry, from the storage of contaminated equipment in a storage cabinet. And this incident was reported in accordance to Price-Anderson.

The M building, is one of the earliest buildings. And it was -- construction was completed on this in January of 1948, and several modifications were made between 1960 and 1991. It was initially known as the maintenance shop. And it did lots of things over time, including machining lathes, lithium processing, drill presses, power presses, electroplating electronic maintenance. They added an ES&H office in a high bay area which was towards a crane spanning the area.

According to a 1999 process and structural study of the building, the historical -- this report suggested that the M building may have housed a power plant, contaminating, high level spent fuel reprocessing waste prior to disposal. But I also discovered a 1952 directive from the AEC, that suggested that this facility was to be established in the semi-works building. So, there's sort of contradictory information

about whether or not that building was the building that might have handled the, essentially the high level radioactive waste coming out of Oak Ridge and Hanford during that period.

The machining operations in room 78, and 7-8, were originally implemented as part of the polonium operating, and depleted uranium were machined in room 7-8 -- 7 and 8. The environmental permitting document filed in the early 1990, suggested that uranium machining was part of the activities included in the M building. They were doing thermal studies for RTGs in the high bay area. And according to the 1997 baseline, radiological characterization report, samples from the high bay had maximum total alpha and beta activity of somewhere under 100 to somewhere -- to 5,000 DPM.

Leak contamination was found at relatively low levels. And it appears that the machining room, 7, 8 and 20, were not

included in the survey.

In mid-1998, the wooden floor from the high bay area of the M building was removed because of radiological contamination and I don't know the degree and extent of contamination. It was just simply noted. And on September 8, 2000, the building was demolished.

So, this is sort of just a brief look at this. It appears that the Working Group should consider whether an assessment is needed to determine one, the potential exposure pathways during the operations of the T and DS building; and b, if data is sufficient to enable radiation dose reconstruction for workers who might have been exposed in buildings 48, 89, M and DS.

MR. MAURO: Bob, this is John Mauro. Just one very quick question. When you make reference to 100 or 5,000 DPM, I'm assuming you mean 100 or 5,000 DPM per 100 centimeters square?

MR. ALVAREZ: That's correct.

MR. MAURO: Okay. Thank you.

CHAIR BEACH: Anybody else on this topic?

MR. BUCHANAN: Are those samples fixed, or swiped?

MR. ALVAREZ: They were the, I think the 1997 samples were swiped.

I mean, what I found interesting, remarkable about the 1997 survey, was the degree and extent they performed sampling in the DS building. And I think their -- that at least one of the contractors who was bidding for the closure of the Mound site, was concerned enough to ask some very pointed questions about the relationship between the DS building and the T building. And a lot of this was discussed in the structural and process history of this building.

MEMBER ZIEMER: I'm requesting, Bob, this is Paul Ziemer. The reference to radon contamination is a curious one. Is

there any indication in the report that you looked at, as how they went about identifying -- I mean, radon is very short lived and it's daughters are very short lived. So, what are they looking at there?

MR. ALVAREZ: Well, I really don't know, Paul, to tell you the truth. Because I'm just simply, essentially reporting --

MEMBER ZIEMER: Yes.

MR. ALVAREZ: -- what was in these documents, which do not sort of get into that level of detail.

MEMBER ZIEMER: They don't give the detail on how they identified contamination as radon?

MR. ALVAREZ: I really don't know. I just simply am reporting what was in the document.

MEMBER ZIEMER: That doesn't makes sense.

MR. MORRIS: You can easily cover -- come back an hour later and make the same

measure, and if it's not there, in a pure context, decide that. I've seen that done in operational health physics program.

MEMBER ZIEMER: Well, this is a building survey done after the work was done. I mean, it's
-- I don't know. It just seems a little strange to me that someone could have identified it.

MR. MORRIS: It happens all the time on coolers, if they send shipping samples back and forth, and I can tell you --

MEMBER ZIEMER: But that's an active process where some -- if you're accumulating something, and you take that sample and count it, it's usually not a swipe sample. Well, it could be, if it was an active process.

MR. MORRIS: Sure. And in the D of E reg, you would have had Coleman coolers going back in the hundreds back and forth from a sampling location. I just have seen

that many times in my experience.

CHAIR BEACH: Won't you see those decay?

MR. MORRIS: That's right. That's why they say, it's the radon.

CHAIR BEACH: Well, in this instance here, they're saying that --

MEMBER ZIEMER: Only if it -- only if the generating source is there just before you --

CHAIR BEACH: Right.

MEMBER ZIEMER: -- took it. I mean --

MR. MORRIS: It's a static electricity problem. It really is -- it's an on-going operational detail of any kind of program.

MR. MAURO: From my recollection, the numbers that we were hearing, the 5,000, the 100, it immediately brought to mind Reg Guide I 1.86 in the DOE order, that goes toward acceptable levels of clearance. It

was basically the clearance standard. And whenever you're going through D&D, at least at one point in time, if you met that for removable contamination, 100 for gross alpha, which were presumed to be transuranics, along with alpha emitters, 5,000 for gross beta gamma, that meant you were okay.

Now, perhaps the radon we're hearing is -- you would normally not include that.

MR. MORRIS: Well, that was my initial reaction, is that you brought that up. And my reaction is, why would you even think about putting that in the report log?

MR. MAURO: To get the short-lived alphas out of there. Because you don't want to leave the impression that the 100 DPM per -- 100 DPM to 170 squared number was from some long-lived radionuclides if in fact it was from short-lived radon progeny.

My take on this is that it's a negligible idea. That you -- you know, radon

contamination at any level, if you decide that that's what it is, it's just a problem of being alive, you know. It's not an operationally related problem.

MS. ROBERTSON-DEMERS: Well, there's a possibility when radcon found a sample of suspicious activity, they would send it over to the environmental monitoring group who would put it on a germanium detector. So, there's a possibility that's how they identified it.

MR. FITZGERALD: Josie, I want to speak to the, sort of the broader implication on this one. I mean, it's sort of why we went through all of this.

You know, we interviewed a number of workers, quite a few actually, between the site profile and the SEC review, probably 30 or 40. And we came away with the same kind of sense, I think, that NIOSH did. The people we talked to felt that the badging process at Mound was pretty tight. And you

couldn't just walk into rad areas as a site-wide maintenance person and not be badged.

Even if you were unbadged, you would be badged when you entered a radiological area. And that kind of put forward though, the question of testing that premise. Because it's suggested it was tight enough that you didn't have to be concerned with the non-badge people, because they couldn't get exposed, essentially, and you could assign them the ambient environmental dose, and that would be fine.

So, this was kind of a test to see based on the D&D data, because again, because Mound was D&D'd and you know, went through closure, you had a lot of characterization that was done on these facilities. Quite apart from what people remembered, they actually went through and characterized each one of -- each and every one of these buildings.

And this data, I think, is what

we're looking at now, saying, you know, were there facilities that were understood to be non-radiological facilities that were in fact, you know, had some residual contamination based on these baseline reviews. And does that then suggest that, you know, one, is this just exclusive to these four facilities?

I think Brant, you're all looking at the D&D data. And you know, there might be more information about perhaps other facilities that were deemed nonradiological, and open to nonbadged people, but may in fact have perhaps some identified contamination, and some pathway to address how does one handle then, exposure that may or may not have been received by workers that might have gone in there.

And I think for maybe, clearly, there's one facility, the DS. It looks like it might have been appreciable amounts that there would be some accounting for that

contribution perhaps, by people that might have been in that facility. And I think that's where that was headed. This is just a first order, I think, testing of the hypothesis that it was a pretty tight system and people who were not monitored could not really have been exposed to operation. This seems to suggest there might have been some contamination.

MR. ALVAREZ: I mean, the DS building was the most intriguing because the December 1997 baseline radiological survey of all the buildings, including nuclear buildings out there, the DS building appears to have the most pervasive and significant residual contamination from tritium of all the buildings, including the SW, the T buildings, the H buildings, the buildings where they were handling, you know, substantial amounts of radioactivity.

MR. ULSH: Okay. Again, I want to start with kind of a larger context on this.

This piece was presented in support or related to issue number 17, which dealt with badging policy. And at the last Working Group meeting, as Joe stated, this was one of those that SC&A had taken a look at. And it was kind of headed towards, maybe this is not an SEC issue, but keep the possibility open while you look at other data.

So, I'm presuming that since this piece came after that, this represents that category of other data that might make us say, hey, well, wait a minute, some more looking needs to be done here.

MR. FITZGERALD: Yes. And again, it's not dead-on the issue raised in that particular item.

MR. ULSH: Well, that was -- this is --

MR. FITZGERALD: It's more of a, somebody, I think, at the last Work Group session, maybe it was Mike Gibson, or somebody, raised the thing saying that they

were aware of exposures that may have taken place. So, this is not a question of what's the most exposed badge. This is a question of -- and we got into this discussion in this context, which was how tight was the system? Because there was a, sort of a -- and we agreed, because we heard it from the same workers that you talked to, that it was a tight system and people just could not go into rad areas without getting badged.

So, this was, I think, the result of that discussion that we got into, which was, can one test a hypothesis. And I think this is the first test that we did.

MR. ULSH: Well, any reaction that -- we're holding our formal response to this. Because of the 15 references, we have access to 9, but there are 6 more that are in DOE's hands for review. And so, we don't have access to those six references at this point.

Once we do, we'll take a look at those, and then incorporate anything that we

find in our --

MR. FITZGERALD: They should be forthcoming.

MR. ULSH: -- okay, in our response.

But the first thing that kind of confuses me about this particular piece, is your conclusion that these are nonrad buildings. We haven't seen anything that characterizes them as nonrad buildings. In fact, if you look at the Wayne King document, which was, the purpose of which was to provide some background characterization of what went on in particular buildings, and rooms in buildings, and what radionuclides you might find there.

Clearly, there are radionuclides that are listed in that documents in these buildings.

MR. ALVAREZ: But not these buildings. I mean, I went through that King document. And the more enlightening

documents are the structural process history of these buildings. Which -- and also, the other document which I think is important, which is not in DOE's hands, is the 1993 physical characterization of the Mound facilities, where they -- it made it clear that these buildings were not nuclear buildings.

CHAIR BEACH: Weren't these also in the road map as nonrad buildings?

MR. ALVAREZ: Yes. I don't know if they're on the road map, but I went through that King document very carefully to see, to try to find these buildings. And they weren't -- they really weren't referenced. And only when I found, went into the sort of the individual histories of these structures, that you find some of this stuff.

With the exception of the DS and M building -- and by the way, the King report does reference the M building. It doesn't reference the other buildings. So, I stand

corrected. But the DS building is not even on the radar chart of screens -- of the King building.

Now, attached to the King report, is this 1997 baseline characterization report, which has quite a bit of sampling data about the DS building. But there's no reference in the King report about the DS building at all.

MR. ULSH: Well, I'll have to take a closer look at it. And we'll include that in our response to it. But the implication seems to be that these were not radiologically controlled areas. I don't know that we're prepared to accept that, either. And by implication, that workers, unmonitored workers, could have gone into these buildings. We've seen no evidence of that. In fact --

MR. ALVAREZ: Well, I don't know where the truth lies in that either, Brant. I just know that this is what they were

reported as being. And that several of these -- at least two of these buildings, the DS, 48 and 89, were not considered to be handling any radioactive materials.

MR. ULSH: Well, not at that time.

MR. ALVAREZ: Actually, during the period of let's say, historic operations. Buildings 48 and 89, were explicitly used to handle radioactive materials during the closure period. The M building did have -- handled radioactive material off and on, and I'm not sure what exactly they did, other than what's been reported. But the one that really stands out here is the DS building.

MR. ULSH: Well, in order for this to be an example of people with a significant exposure potential, but missed exposure potential, because they weren't badged, the people would have to in fact be not badged. And we don't find evidence that that's the case.

MR. ALVAREZ: Well, it's not only

not badged, but were there bioassays performed. Because the contamination issue, especially with DS building, appeared to be mostly associated with loose tritium. And it was quite pervasive, and in some cases, significant.

MR. ULSH: Exactly. That was going to be my point. Was that the contamination levels that you've cited here, while the numbers sound really big and scary, they certainly are not sufficient to indicate a need for external exposure monitoring.

MR. ALVAREZ: Well, they do indicate a need for them to be cleaned up to a level to meet DOE's clearance standards.

MR. ULSH: I agree. However, if you look at ANSI/HPS N13.12-1999, and we'll have that in our -- I'm sure you didn't quite get that written down.

MR. ALVAREZ: No, no. I mean, we certainly didn't sort of go, dig that deep and this is a very preliminary paper.

MR. ULSH: Yes. But if you look at values of tritium and plutonium per 100 square centimeters, they give you an exposure potential of one millirem per year. For tritium, it's 600,000 dpm per 100 square centimeters. And for plutonium, it's 600 dpm per 100 square centimeters.

So, while the numbers that you cited sound eye-popping, my point is that, by and large, those contamination levels do not indicate a need for external exposure monitoring.

MR. RICH: Hi, Brant. This is Bryce Rich. Can I make a couple comments?

MR. ULSH: Jump right in, Bryce.

MR. RICH: Number one, there are two issues of the King document. The later edition does include the DS building and the other buildings as rad buildings. And as you mentioned Bob, the survey, the closure survey, it was performed in order to clearly identify the conditions where they might have

to segregate materials for disposal.

It's a little different survey. And perhaps a good deal more than what would normally be necessary for radiological protection on a routine basis.

MR. ALVAREZ: I mean, I may be wrong, but I recall the 2000 iteration of the King report did not mention the DS building as a rad building. Attendant to that DS -- to the King report, was the baseline survey.

MR. RICH: There's another issue. We can get that for you.

MR. ULSH: Okay. Well, especially the big numbers that you had questioned, concerned about, were for tritium contamination.

MR. ALVAREZ: And alpha contamination as well.

MR. ULSH: Right. But my point is that I don't know what type of dosimeters are appropriate for tritium contamination, because you don't get an external exposure

from tritium.

MR. ALVAREZ: Well, I guess the questions that arise here -- actually what at issue here is not whether or not -- I guess the first-order question, is not you know, whether this is -- these contamination levels are significant from a point of view of dose reconstruction in and of themselves.

I think the first-order question is, why did this contamination occur? And did it occur historically, especially in the DS building, during -- because -- from the 1960s to the 1990s or not? Where did this contamination come from, I think is the first-order question.

MR. ULSH: Well, I don't know that I can answer that off the top of my head. However, I think the important concerns, since this is presented under Issue 17, are: does this represent a situation where you have unmonitored people being exposed to having some significant exposure potential.

And I don't see anything in here that indicate that that's the case.

MR. FITZGERALD: Yes. But you know, let's back up again.

MR. ALVAREZ: But this is just a snapshot in time of 1997. That isn't to say that you might not have significant exposures historically, which may or may not been picked up.

MR. FITZGERALD: I think -- you know, I don't think there's any argument about it. I think the question had come up in the context of badging. And I think -- we didn't pick these facilities. I think these facilities were suggested. And I can't recall who actually suggested them.

MR. ULSH: I don't know. It was probably during a Working Group. Maybe it happened off line, or maybe I just don't remember.

MR. FITZGERALD: We were tasked with looking at these four facilities in this

context. And in terms of whether or not these nonrad facilities, in fact, had radiologically significant sources that would be considered.

And I think that is a legitimate question, as to whether or not one would, had been badged, should have been badged, and that gets to the heart of this particular item anyway. And this only gets you half way. It says that we've looked at these facilities as directed by the Work Group. And I think as Bob has indicated, we've found some source terms that some of which may be questionable, others would need to be addressed from the standpoint of historically were people exposed who were badged or not.

I think that's where it leaves it. And I think the step we took was just simply to look at the facilities from that standpoint. So, I think we still have that second question you're raising, which is okay, so what? Should these people have been

badged, were they badged? Were site-wide, people going in, or were they in fact, as people have said on and on, stopped at the door and given a badge? I think there's questions revolving around these specific facilities that have to be asked.

MR. ULSH: Well, then, I would remind you that during the D&D era, you know, like certainly in 1997, the DOE, standing DOE orders at the time were that badging was required for, if you had exposure potential of 100 millirem per year. And I don't see anything in here that indicates an exposure potential of 100 millirem per year.

Now, I mean, I'm not saying that that's necessarily the end of the story, I just don't see anything here that's a smoking gun.

MR. STEWART: And just to magnify that a little bit, if you were considering potential exposure to tritium, your best bet is bioassay because it is easy and

inexpensive and very accurate. And if you ran a tritium facility, you would not rely on external dosimeters to give you any information of what was going on.

MR. ULSH: That's right.

MR. STEWART: Also true if you have an alpha contamination facility, you know, that might argue that you had a source in other parts of the facility. But alpha contamination in and of itself is not effectively measured by an external dosimeter. So, you'd consider those program aspects separately, bioassay versus external dosimeters.

CHAIR BEACH: Well, in the D&D era, did they bioassay? I always understood they did not bioassay during that time period.

MR. STEWART: There was bioassay conducted.

CHAIR BEACH: During the D&D era?

MR. ULSH: Oh, yes, absolutely.

MR. STEWART: Yes.

CHAIR BEACH: Was there?

MR. STEWART: Yes.

CHAIR BEACH: I read a report somewhere that I thought it led me to believe otherwise.

MR. STEWART: One of the other issues is, was monitoring adequate during the D&D era. That's one small possible universe.

MR. FITZGERALD: Well, I think you know, certainly for DS, I understand what you're saying, Brant, in terms of exposure levels warranted monitoring, maybe contaminated facilities, but DS, I would think, we'd want to know to what extent tritium bioassay was done in that facility, just as it raises some questions about a source term that may have been known. It may have been that in fact, bioassays done in that facility. But, I think that would be the next question.

MR. ALVAREZ: Well, the DS

building raises a question not just about what I call the closure era there, because D&D was on-going at the site, but rather the closure period. But is, whether or not there was contamination going on because of its relationship to the T building historically, and whether or not workers were being monitored, whether it be for external or for internal assimilation during that period. And these are all unanswered questions.

MR. ULSH: Well, I think, okay. I think perhaps the next steps in this issue would be for us to respond to your report, which we will do once we get the other six references from DOE.

MR. ALVAREZ: Okay.

MR. ULSH: Assuming that that happens relatively quickly, our response should be in the Working Group's hand by the next Working Group meeting. But this is the kind of the issues that we're going to be addressing.

MR. FAUST: This is Leo. Can I make a -- jump in here, too, for just a second?

MR. KATZ: I'm sorry. Can you identify yourself again, please?

MR. FAUST: This is Leo Faust. The DS building actually was, handled all kinds of radiological materials, mostly in sealed form for calibration and quantification purposes. The incoming materials that came from Savannah River for instance, were characterized in the DS building, because it was a metrology facility to start with. And they did find that they had some residual contamination on the shipping containers.

MR. ALVAREZ: Leo, were workers badged and bioassayed in the DS building?

MR. FAUST: Well, every person on the Mound site, as near as I can tell, was bioassayed at least annually. And there is some indication that all individuals on the

site were issued a dosimeter, post about 1978, or `79.

MR. ULSH: That wouldn't have been true after -- in the `90s, would it Leo? It would only have been based on your exposure potential, right?

MR. FAUST: I can't answer that right off hand, but there is a letter that we uncovered that indicated that, as of that date, all personnel on site would be wearing a dosimeter.

MR. FITZGERALD: That was `79, Leo?

MR. FAUST: I believe so. Just a moment. The letter is dated February 1987. It supposedly goes into effect the following quarter.

MR. ULSH: Leo, you can't see my startled look here. Perhaps before we put that out there, we should talk about it and take a look at it. Because I would be very suspicious that that might not be true during

the D&D period. But we'll take a look.

MR. FITZGERALD: Well, again, before we leave this issue, I think again, this was a very specific tasking to check or test the premise on these so-called non-rad facilities. Now, if these non-rad facilities, ostensibly non-rad facilities are in fact considered rad and were handled that way, I think the issue tends to go away. But, again, we did the quick review and this is what we found, and I think that disposition isn't necessary at this point.

MR. MORRIS: One thing I'd like to ask you to be careful of is nomenclature on this. Because I heard non-nuclear, non-rad and sort of interchangeably wording, you know, making that definition. They're significantly different definitions in some eras, and non-nuclear facility is not necessarily a non-radiological facility.

MR. FITZGERALD: I'm more comfortable with non-rad. Nuclear gets into

facility.

MR. MORRIS: I did hear Mr. Alvarez say that.

MR. FITZGERALD: Right. It should be non-radiological. And that's what we have, I think, in the white paper.

MR. ULSH: Yes, you have non-rad.

CHAIR BEACH: Non-rad.

MR. FITZGERALD: And again, that wasn't our handle. I think it was given to us to look at these ostensibly non-radiological facilities and to validate whether there's any evidence of sources in those buildings. And I think that's all we were asked to do. And we didn't go any further than that.

CHAIR BEACH: Well, our concern was that they were non-rad buildings, therefore, could workers be in those buildings non-badged, which is part of this issue.

MR. ULSH: Could I ask a favor from, I guess, Bob? If I missed it in the

white paper, and you talk about the genesis of that non-rad designator, could you just perhaps, maybe you know offline, you know, in an email or something, send that over to me, or if it's in some supporting document or something, just point it out to me?

Because you know, it may be that we just haven't seen it. But we haven't seen anything that indicates that non-rad designator. So, if you have something, we would like to see that.

MR. FITZGERALD: And you know, I think we very purposely put non-rad in quotations in the title of this piece. Because it was sort of given to us in that context that these were ostensibly non-rad. I don't think we had a judgment as to that classification at all.

MEMBER ZIEMER: And could you clarify -- Bob, this is Ziemer again, clarify whether that nomenclature includes counting facilities. As I understand it, the DS was a

-- the DS building was a counting facility or a standards lab, which would mean that there would have check sources and standard sources and so on. If so, is that still a rad building?

Because in most places, in fact, if it's going to be used as that, if you have any significant levels of contamination, you've lost the use of the facility. If they were able to use it up into the `90s as a counting facility, then the tolerance for contamination levels or significant sources would have to have been very, very low, or you couldn't use it as a standards facility. If things are, quote, crapped up or if there are significant external sources then, you have a problem.

So, it's sort of inherently, it's sort of makes the case for the fact that you could not have significant sources. In many facilities, you don't badge those people that are handling little check sources in things

that would never give you close to the 100 millirem. But I don't know. It appeared from the narrative, that it had that status at least up into the `90s.

Was there also an issue of whether there was cross-contamination from tritium releases on site which might have permeated other facilities?

MR. FITZGERALD: Yes. I think the implication which we can't run to ground, but given the tritium observed and what as you're saying, a check lab, its location above the fill pond, the T building, there's that implication that you know, is this a known cross-contamination? Is it something that was only picked up during the D&D process? I -- you know, I would think you would have picked that up during operations if there was some fugitive tritium. I mean, that would be something that they would look for, I would think.

So, it raises more questions than

it answers at this point. And you know, this sort of just tees up the question for than anything else.

MR. ULSH: Yes. The DS building was built on top of the T building for seismic stability. We haven't seen any indication that there was any transport of tritium between the two buildings. But like Joe, I can't say one way or the other. It's just that we haven't seen any evidence that that occurred.

MR. FITZGERALD: I think the premise of looking at that facility was, it was known to be not a production-type facility but as a metrology thing. And I don't want to get hung up on this non-rad or rad. Because I think it was given to us as -- I just went back to the white paper and just double-checked. It says, ostensibly not rad, non-rad in quotations. So, we're not labeling it that way. But that was the premise that we looked at it to see whether

or not there was any information.

MR. ULSH: And really, it's a matter of semantics anyway. What we're concerned about is, to work in that building, were you monitored?

MR. FITZGERALD: Yes.

MR. ULSH: That's really what we're talking about there.

MR. FITZGERALD: Yes. And I would -- and the underlying question is, was tritium known or unknown. And if tritium was known, was it bioassayed. Just some basic questions, I think, that would add to that.

CHAIR BEACH: Anyone else?

MR. FITZGERALD: And in Paul's context, we didn't want to go any further than that.

CHAIR BEACH: Okay. So, are we finished with this item? Action is to respond to SC&A's report and the agenda says it's lunch time. So, break for lunch until 1:00 o'clock. Are we right close?

MR. KATZ: Yes, it's noon right now.

CHAIR BEACH: Okay.

(Whereupon, the above-entitled matter went off the record at 12:01 p.m. and resumed at 1:01 p.m.)

MR. KATZ: Hello. This is Ted Katz the DFO for the Mound Work Group of the Advisory Board on Radiation Worker Health. And we are just coming back after a lunch break. I do want to check to make certain we have Phil still back on the line, from the board.

MEMBER SCHOFIELD: I'm back on.

MR. KATZ: Okay. And then, we're not going to run through the roster again. But you can begin.

CHAIR BEACH: Okay. Thank you. Before we begin, I want to go back to the last issue, the Wayne King document. I know it was briefly mentioned that there's a new 2000 version. If I am correct, I heard that

from --

MR. ULSH: Yes, I heard that too.

MR. ALVAREZ: There's an Issue 3 that -- this is Bob Alvarez, I'm sorry. There's an Issue 3 that was reviewed and approved by TD Morris on 3/22/01, and it was issued -- was authorized for use in July 31st, 2000.

CHAIR BEACH: Okay. So is that available to everyone?

MR. ALVAREZ: I assume so. I'm not sure.

MR. ULSH: I will -- we will check and make sure that it's in the SRDB and if so, we'll let you know the number, the SRDB number.

CHAIR BEACH: Okay.

MR. ULSH: And if not, we'll give that back.

CHAIR BEACH: So, you'll take that on to email?

MR. ALVAREZ: It's the same

reference number, except it's called Issue 3.

MEMBER CLAWSON: Is this the one Bryce was referring to?

MR. ALVAREZ: I don't know. But I went -- perhaps. But I went through this over lunch time, and could not find any references whatsoever to the DS building.

MEMBER CLAWSON: But you can follow up with Bryce, make sure we're on the same page of which one?

MR. ALVAREZ: Sure.

CHAIR BEACH: Thank you.

MR. ULSH: Bob, I think, that's my action item. I'll take care of that and let you guys know.

MR. ALVAREZ: Okay. Thanks.

CHAIR BEACH: Okay. So the next on our agenda is, the SC&A Draft Preliminary review of Price-Anderson Issue 21. Does everybody have that, copy of that available? Everybody here? Are you going to start that also, Joe?

MR. FITZGERALD: Yes. Let me start that off.

I guess starting in the beginning there were several issues raised by the Price-Anderson Act violations that were levied on Mound back in the mid, it might be `97, but mid-90s, basically. And these spoke to deficiencies of bioassay, the management and administration of bioassay program and the way it was administered in terms of the decision levels, MDAs, pretty much across the board.

So there was some pretty serious issues which they received penalty for. And the implication for the Work Group was to ascertain how NIOSH intended to address those issues which pertain to dose reconstruction. And a white paper was developed, that brought the worker through a number of the RWPs, and I think it was your request, as to SC&A's view, review of that white paper and those findings.

And I think at the time, we said, well, it would be difficult without doing some sampling to give you that answer. And I think the Work Group wanted SC&A to pose an approach. And the approach we took was basically to walk through, since SC&A -- I'm sorry, since NIOSH had gone through all of the actions, to actually walk through all the RWPs involved and to draw our own conclusions about the implications for dose reconstruction.

And this paper is really the, more or less the results of that review. And there's a matrix in the back in particular which goes item by item. And what you'll see there, is that by and large, we're in agreement with the NIOSH conclusion about these not being SEC issues, without going through a lot of detail.

A lot of these are really programs, management questions that speak to compliance in conformance with required

practice by DOE, but not to issues that would preclude dose reconstruction. So we were in concurrence with that understanding. As I recall, there were a couple of issues that NIOSH was doing further investigation, so we kind of let that go as such, and are waiting that -- those determinations.

And four of the issues got to a more generic question of follow-up monitoring, where you had relatively short-lived nuclides, and whether or not bioassays were done in a timely manner. And we felt that really was less a issue -- a specific issue in the context of Price-Anderson and this particular instance, and more germane to this broader review that we're doing of the adequacy of internal monitoring.

So, when we say, Issue 11, I think we have said Issue 11 in a couple of cases, we're just saying, you know, that's a broader question that we're addressing and we'll have white paper for in you know, two or three

weeks tops. And that's where we want to treat those issues of, you know, the implications for dose reconstruction, if in fact, follow-up monitoring bioassay wasn't done in a timely manner, and how that might affect the feasibility of dose reconstruction.

So, the matrix is really a scorecard going through systematically, as NIOSH has already done as well, in showing where clearly in concurrence where they still have work to do, and where we think, you know, this is a broader issue that we're going to treat in this upcoming white paper. And that's pretty much it. I mean, I don't think -- I think the details are there. If there's any questions, Brant, you -- any clarifications, we can go through that. But I think it's self-explanatory.

CHAIR BEACH: Go ahead.

MR. ULSH: Okay. Joe, you mentioned our original white paper that we

sent over in advance of the previous Working Group meeting. I wonder if, though, you considered the followup document that we also submitted?

MS. ROBERTSON-DEMERS: Yes, we did.

MR. ULSH: Okay. Gene, are you on the line?

MR. ROLLINS: Yes, I am.

MR. ULSH: It seemed like some of the issues that you raise as being outstanding were discussed in Gene's followup. And Gene, I'll kind of let you take it from here, and kind of walk us through that if you would.

MR. ROLLINS: The two open items are for the 15 unanalyzed Actinium-227 samples discovered in August of 2001. And I'll discuss that, but let me mention a second item. Other workers who entered the WD building on February 12th, 1998, when that building should have been posted for full-

face respirators, while the ventilation was shut down for the filter change, and that one was addressed in a lot of detail in a follow-up document, which I don't think you are -- SC&A is taking into account.

MR. ULSH: Well, that's the Attachment A, right, Gene?

MR. ROLLINS: That's the separate -- the WD building was a separate paper. The summary I provided was dated the 28th of July. I think you sent that to the Board, or Working Group.

MR. ULSH: Boy, I hope so. I got one here that I sent over on August 21st, requested follow-up investigation, regarding the RWPs affected by the Price-Anderson Act violations at Mound. Well, Gene, walk us through it. And I'll get together with SC&A here at the meeting and make sure that they have received all of the documents on this issue that we have produced. I think so, but --

MR. ROLLINS: Yes. The second one was the analysis, was, I titled it, An Analysis of The Other Workers Who Entered the WD Building When its Ventilation Was Shut Down and It Was Not Posted for Full-Face Respirator Use as Required. Short title.

MR. ULSH: Okay, Gene --

MR. ROLLINS: Yes. That should have been provided to everyone.

MR. ULSH: You know what, that -- I'm going to have to take that one. That might be something that I didn't get to you guys. I'll have to check. But can you walk us through the big picture on that?

MR. ROLLINS: Okay. Let me start with that one. Basically the situation was that the Price-Anderson finding found work control issues with seven folks who did work on this filter change, and that their work did not properly control and so forth. I think SC&A has agreed that those people, you know, we pointed out the RWP. We know who

those seven people were. We know what their follow-up bioassay was and so forth.

And so the issue was with the fact that the Price-Anderson documentation also indicated that the building should have been posted for full-face respirators during the period. And I think it was a period of maybe four hours. We have the sign-in dates and sign-out dates on the RWP. So, we know about how long the ventilation was shut down.

Anyway, there were seven additional workers. So, we know it's in both cases, there's seven. That's not a -- that just happens to be a coincidence. There were seven other workers not involved in this job, who signed in on a general RWP on that same day. The RWP number was LW-015-098. This was February 12th, 1998. So we know who the other workers, the other workers were.

And this is a, you know, a general RWP. I think most people are probably familiar with what those are used for.

Anytime you enter a building to do sort of routine sorts of things that are not invasive, and so forth, like it might involve checking a gauge, or some sort of routine maintenance type of thing.

So, we have seven folks, as I mentioned, who signed in on an RWP on the date that work was done. So then we went and looked at, well, what bioassay did these folks have. And so, I looked in the MESH database for follow-up bioassays for the same radionuclides that were covered in the RWP for the invasive work, in other words, the actual changing of the filter. And to briefly summarize, and this is -- you'll get all this detail when you receive the full paper, but four of the seven workers on the general RWP did not have any results above the decisional level. I think I went out for, and looked for the next 12 months for those same radionuclides.

Two workers had one thorium-228

above decision level, and the last worker showed Plutonium-238 and as well as thorium isotopes above the decision level. So, the question is, those are -- those positives are both rather long-lived, well-retained radionuclides.

So, we then looked at what the bioassay history was for these workers. And found that in all cases, the folks who showed above-decisional workers, above-decisional results, for the same isotopes, did have a history of having positive results for those isotopes. So, it looks like that would be consistent with what their previous bioassay history had been.

And as I mentioned before, four of seven did not have any positives in bioassays that were taken after this event. So, from that we conclude that we know who the folks were who entered the building on that same day when it was posted. And I think I forgot to mention that the general RWP would not

have required full-face respirators or in fact, it would not have required post-job bioassays. It's just sort of a general thing that stays open for about a year, in most cases.

So, I think we know who the folks are, and we know the follow-up history.

MR. ULSH: I would propose as a follow-up, that I will go back and double-check and make sure that there are no documents in my inbox that need to go over to you all. If there are, I'll make sure to get that over to you perhaps we can discuss that at the next Working Group meeting. And then we will await your white paper on Issue 11.

MR. FITZGERALD: Yes, which should catch up with all this, too.

MR. ROLLINS: Okay. If there are no questions or anything on that part, I can talk briefly about the 15 unanalyzed Actinium samples.

CHAIR BEACH: That's -- I don't

have any questions.

MR. ULSH: Go ahead, Gene.

MR. ROLLINS: Okay. On the 15 unanalyzed Actinium samples discovered in August of 2000, you may recall that these were mixed in with other backup sample -- with backup samples of an earlier incident. And they were thought to be a part of these backup samples, but it turned out they were not in fact. They should have been analyzed, and they were not being -- should not have been held for backup purposes.

Eleven of the 15 people did not have any Actinium-227 samples collected after the date of the samples in the refrigerators and the date of discovery. So that would leave four that did, in fact. We could find no documentation, or haven't found any documentation as of this point listing exactly who these folks were.

In other words, the following list was involved. But I did search the MESH

database in a number of different ways looking for how one might conclude who these folks were. And the best thing I've come up with so far, was using the fact that the Price-Anderson documentation indicates that the follow-up actions were taken and closed out, essentially the next day. In other words, they restricted the workers, and requested samples.

I can find in the MESH tables 14 Actinium samples that were scheduled on the 1st of August, which is the date of this discovery. And there are no other Actinium samples scheduled between July 24th and August 7th. So, about a week window either way from this event. And the number is about right. So, this seems like a likely group of people. But I can't find anything in the MESH data that, you know, gives a code or a reason why these samples were taken that would tie all these together.

So, I've provided a list of names

to Brant, and I believe he's going to followup on those.

MR. ULSH: Yes. I want to make sure we've got the right people. On this issue, surprisingly, at least, it's a surprise to me how difficult it's been to find out who -- exactly who these people are.

As Gene mentioned, we've got this list of putative people, but quite frankly, I'd like to throw it out to SC&A and ask whether in your discussion with former workers, if you can think of someone who could perhaps help us identify who these people are. I'm thinking about talking to Mike Gibson.

MR. FITZGERALD: That would be my first impression.

CHAIR BEACH: Yes.

MR. ULSH: And if you all can think of any other people that might be intimately involved with this, and would know

who their fellow workers were, that were affected by this, we would appreciate anything that you could provide too.

MR. FITZGERALD: I would start with Mike, and then maybe he would know other people that would help on that.

MR. ULSH: Yes. And we can run this list of 14 people by him and see if that sounds like the right group. But it's been surprisingly difficult to figure out who these people are. I figured it would be pretty easy.

MR. FITZGERALD: It's not ancient history, either.

MR. ULSH: No, no. It isn't. I think part of the problem is that when DOE requested a report on this issue, they specifically requested that the names not be included for Privay Act, obviously. You know, that causes us a little problem when we're trying to back track and figure out who it is.

So, we'll check with Mike, and you know, I bet that list was in -- and see if he can provide any insights on that.

MR. FITZGERALD: And we found a lot of files in the data capture that we did with ORAU, that spoke -- and there was a whole box in this Price-Anderson Act violations. I don't recall seeing that list, per se, but that would -- it could be a resource as well, I think.

MR. ULSH: Yes.

MR. FITZGERALD: Internal records would have names.

MR. ULSH: We looked through 2,000 or so pages of material.

MR. FITZGERALD: Yes. There's a lot.

MR. ULSH: And that didn't provide an answer to us.

MR. FITZGERALD: Yes. I didn't recall seeing it.

MR. ULSH: But we'll report back

to you on that as soon as we vet that list, and talk to Mike and whoever else we need to.

CHAIR BEACH: Anything else on this issue, or are we ready to move on?

Okay. The next on the agenda is open discussion. NIOSH, I guess we're putting it into your court, on data. You sent out a lot of just data.

MR. ULSH: On the 20th. And so we -- let's start with the neutron.

MR. ULSH: Okay. Leo, are you on the line?

MR. FAUST: Yes, I am.

MR. ULSH: Basically, the status on this is we are preparing a -- well, I guess for lack of a better word, a white paper, or a table, whatever you want to call it, on estimating neutron doses at Mound. It's not ready for this meeting. But I didn't want to -- I wanted to provide the raw data anyway, that we have in hand, to you all, as soon as possible. So, that's what we

put out earlier. It was like, just raw data.

CHAIR BEACH: Right, exactly.

MR. ULSH: We had -- there's a large body of data on instrument surveys in the field. There's also quite a lot of paired dosimetry data. And we're going to be using both of those sources of data, or at least, we're going to be talking about them, in the position paper that we will put out for the next Working Group meeting. But you all have the raw data that we have.

MR. MAURO: Is that paired gamma-neutron so you have ratios?

MR. ULSH: Yes.

MR. MAURO: Okay.

MR. MORRIS: Yes. You'll hear them described as good surveys. So if you -- those are the key words. In fact, if you wanted to search SRDB would -- that -- those key words, you'll find all the documents.

MR. ULSH: But you shouldn't need to because I provided the SRDB numbers.

MR. MORRIS: But you shouldn't -- but you shouldn't need to. That's right.

CHAIR BEACH: Would it be beneficial to have a technical call, much like we're going to have on Issue 9 for this -- that item?

MR. ULSH: I think it would. I think it would. As soon as we put out our paper, and give SC&A some time to, you know, adjust it, it might benefit from a technical -- an offline technical.

CHAIR BEACH: What's the time frame on the white paper?

MR. ULSH: Leo, do you have a time frame in mind? I'm thinking soon.

MR. FAUST: Well, it will be some time after the first of the year.

CHAIR BEACH: What?

MR. ULSH: We'll talk, Leo.

CHAIR BEACH: I was thinking before Thanksgiving.

MR. FAUST: I doubt that very

much.

MR. ULSH: We'll talk internally.

MR. FAUST: I would think some time after the first of the year, perhaps before -- I don't know when your next meeting is, but hopefully before that.

CHAIR BEACH: We haven't scheduled it yet.

MR. FAUST: Make it late in the year.

(Laughter.)

CHAIR BEACH: 2009?

MR. ULSH: We'll talk, and get back to you with a proposed date.

CHAIR BEACH: We'll get back to that. Okay.

MR. MAURO: I would point out the paired neutron-photon measurements have been invaluable on other venues when we're concerned about trying to reconstruct neutron doses with poor neutron film dosimetry, when you actually have data sets, where you have -

- you know, whatever you have your detector. I think the photon, this is -- SC&A's perspective is this is the good standard when you're looking for neutron to photon ratios, when you're going back -- when you have significant limitations in your neutron dosimetry.

MR. ULSH: I agree in the situation where you have significant limitations.

MR. MAURO: Yes.

MR. ULSH: We'll be talking about that issue though, in the paper as well. And there is a significant body of good surveys that are out there. But we just wanted to get the raw data to everybody as soon as possible, so that's in your hand. So, we'll be getting that out hopefully before the end of the year. But that's something Leo and I are going to have to arm wrestle about.

MR. MORRIS: There are literally thousands and thousands of paired neutrons.

MR. MAURO: We just looked at them for Hanford and we're -- it was very helpful.

MR. ULSH: The next body of raw data that we put out was radon. But since we want --

CHAIR BEACH: Before we do that --

MR. FITZGERALD: I want -- is Ron?

CHAIR BEACH: Yes.

MR. FITZGERALD: I want to see if Ron's on the phone. Ron?

MR. BUCHANAN: Yes, I'm here.

MR. FITZGERALD: Okay. Did you -- before you move on from neutrons, the neutron data issue that you've been looking at, is there any clarifying questions, or anything you might want to bring up at this point?

MR. BUCHANAN: Well, this is Ron Buchanan with SC&A and I've been working on the neutron issues at Mound. We understand what you're saying now is -- are you saying that the neutron and gamma data -- I looked briefly over that. And there's several

thousand pages of pretty good survey data there done with Rimbaud-type machines, instruments.

Are you proposing to use this just for unmonitored workers, or are you proposing to use this to replace NTA film, or have you made that decision yet?

MR. ULSH: We haven't made that decision yet, Ron. But I think part of it is going to be where we have reliable personnel dosimetry. So, I'm talking about a person wearing an NTA film, and a person also wearing a gamma -- beta-gamma film. That would certainly be the first source of data that we would use.

In order to do that, we have to talk about limitations of the NTA film, in terms of Mound and whether or not that presents us with problems in terms of the reliability of those measurements. So, that's going to be part of our report, considering potential issues with the NTA

film, and whether that does or does not prevent us from using that as the primary source of neutron dose estimation.

MR. BUCHANAN: Okay. So, that decision has not been made yet?

MR. ULSH: Not finally. Although, I can tell you that we're leaning towards using the NTA film results. But we still have a lot of things to talk about on that in terms of, you know, some of the issues that have been discussed in previous meetings, like, you know, fading on an NTA film, or how much of the spectrum falls below the energy threshold for the NTA film. Those are issues that we will address in that report.

MR. BUCHANAN: Okay. That's where SC&A is standing at that time, is the energy ratio and the fading as opposed to the workplace neutron energy spectrum.

MR. ULSH: Right. We're aware that those are issues that are of interest. So, we will be addressing them.

MR. BUCHANAN: Okay. Thank you.

MR. FITZGERALD: Radon?

MR. ULSH: Okay. It's pretty simple on radon. Same kind of thing. We are preparing a white paper and that will be ready in advance of the next Working Group meeting. In the meantime, we have provided a list of documents in the SRDB. They are health physics progress reports that provide radon data in them.

We have those progress reports up through the 50s. I think that's as far as it goes. We have not yet located the documents for the 60s. But we're looking for those. I suspect that they exist, we'll just have to get them redacted. That's my suspicion.

MR. FITZGERALD: Yes. The question I have on that, you know, we talked about the one or two thousand data points, which I think really changes the issue from where it was before. Which, you know, we had this sort of one graph sample that was taken

in 1980. But these values, having taken a quick look, seem to be in the R building either prior to or during the D&D of the old cave. So, this is sort of contemporaneous with what they were doing with the old cave to you know, go ahead and cap that and all that.

And then in the early 60s, they went ahead and built SW over that, you know, over that. Which led to the ultimate, sort of problem, that we were talking about, which seemed to be the exhalation of the radon into SW and to some extent R, but mostly SW. I guess I'm having a hard time, maybe you can help me on that.

The relevance of these measurements in the R building, different rooms in the R building, presumably from residual contamination, perhaps the old cave, you know, from the old cave going into the R building. But how that would relate to a source term that would have come from an

enclosed, fairly hot source of radium that had a concrete cap, that you know, had a conduit into the overlying building, which was negatively pressured. Which seems to present sort of a perfect storm, if you're trying to you know, come up with a radon problem, is to build a building over top of a radium source, and then have it capped, and then have a you know, a pipeline or a conduit into the overlying building.

And they were seeing, I guess, the higher levels coming from that source. I don't know how those measurements in the R building in the 50s, relate to the presumably concentrated values that resulted in the buried cave, and then coming into the SW. I realize that they're all radon measurements. But I'm not sure how --

MR. STEWART: First of all, the R building and the SW building were sampled. And the SW building is -- was not in fact built over the cave. It was actually room

SW1 of the -- the cave was actually in room SW1. And what they did in fact, just raised the level of the floor about three or four -- and built a new room over that.

And we have measurements from that later I think, `79, `80, `81, and `82, in that time frame. Our reasoning is that it's quite obvious from the documentation, even in the 40s, that the processors knew they were going to have a big problem with short-lived alpha emitters as a result of this work. We're not going to estimate a dose. We're going to estimate a maximum dose. And we figure a great place to tell is during the process period of the activity in the cave. We can't imagine a dose higher than that.

MR. FITZGERALD: I guess that's what I'm trying to figure out. Because in -- I guess talking to Jenkins and folks that did the monitoring, I think their concern was that the circumstances with the cap on the old cave area, and the concentration of, I

guess, radon in that space, and then the exhalation through that rather narrow conduit, whatever it was, served a little seam in the floor into the building, was pretty unique in the sense that it was almost a perfect radon machine in a sense.

I was just trying to figure out if in fact the, you know, the room measurements, while the cave might have specific contaminations, of course in the 50s before the D&D, whether that would be bounding of that circumstance or not.

MR. STEWART: Well, in fact, there are results from the entire operational period of the cave in operation. And there is a variety of ways of looking at it. You can take the maximum radon result from that operation period, and you can make that a maximum dose. You can also take, okay, this is what it was when it was remediated --

MR. FITZGERALD: Right.

MR. STEWART: -- and make that a

maximum dose. And I've always had a little trouble with the concept of a maximum dose, but it's clear to me in doing some looks at these things that a very small amount of radon can be considered in a maximum dose in a results -- in -- can I talk about this?

MR. ULSH: Sure, go ahead.

MR. STEWART: Results in a compensable case based on radon alone, or part of a year of exposure. It does not take much radon. Current value of the GPD, that they assign as the relevant, for R building or SW building, is eight and a half working level months. If you give someone that for a year, most lung cancers are going to be compensable wholly on that. And if you want to throw in Plutonium-238 or Polonium, you're only -- it's like being pregnant. You're only so compensable.

So, you know, we can put a bigger number in there. And we've got some pretty big numbers from these short-lived alpha

products in the 50s. So, we are going to go look at those, find out what best big number to put in there was, and call that a maximum dose. We don't -- we cannot characterize in detail because there simply is no data to calculate an accurate radon dose for those people between `58 and --

MR. FITZGERALD: And that's kind of where that's coming from. Because in a way, this is a surrogate data from the standpoint of the site, a surrogate data from different time frame, different set --

MR. STEWART: Yes.

MR. FITZGERALD: -- of operational circumstances, even through it's still the old cave. And I was just trying, you know, to figure out is this commensurate in terms of characterization. And I guess without knowing what the you know, what the actual measurements were in some of these areas during that later time frame, you are kind of guessing and trying to say, well, can

we pick a scenario where it's -- you know, as you were just saying. It's pretty high, it's not likely, but without a way to do it, not likely to be higher than that in these overlying buildings.

MR. ULSH: Also keep in mind, Joe, that we've not yet retrieved the health physics progress reports for the 60s.

MR. FITZGERALD: For the later, yes.

MR. ULSH: If they follow the same format as the earlier health physics progress reports, there are radon measurements in there. But we don't know that until we get those reports.

MR. FITZGERALD: Yes. I think that's going to be very instructive. Because once the whole gate is capped and SW is -- they raised the floor and all that, I think that would be a lot more indicative, I guess.

MR. STEWART: Yes. We could assign them year by year, and certainly, when

we look at it, it would make more sense from a dosing point of view. More accurate dose reconstruction.

MR. FITZGERALD: Right.

MR. STEWART: But not necessarily a higher dose.

MR. FITZGERALD: Yes. And I guess the reason this has been a salient question for us is that you know, interviewing Jenkins and looking at this issue, this all came up because they were picking up lung alphas that, you know, that were pretty high. And they were thinking they had a plutonium issue, when the back track turned out it wasn't plutonium at all; it was radon.

So they would actually have been able to see it in in vivo counts, which suggests it was fairly hefty. And you would have to say, whoever was in SW19, or adjacent buildings, were probably getting this dose you were talking about, which is a hell of a dose.

MR. STEWART: I believe those current values are reflected, those values are reflected in current technical basis document. The numbers are pretty large.

MR. FITZGERALD: The problem with the technical basis document, I think as we originally reviewed it, was it was based on that one sampling that Jenkins had done. And it was just that one sample. And I guess there was some question as to how reflective of that area, given he himself admits that it probably isn't reflective. I think you have those interview notes as I recall on Jenkins.

But that whole account of why they did it, how they did it, and whether there may be some implications for additional exposure in those rooms and buildings, I think, that was pretty evident. They felt that it was a real issue and that's one reason we went ahead in the `70s and did remedial action and ventilated that space just because it was so high. So, anyway.

MEMBER ZIEMER: Joe, are you really asking whether the air concentration in the later building could have been higher than the original cave? What?

MR. FITZGERALD: No. I'm just saying that under the circumstances by which they were seeing elevated concentrations in these overlying buildings --

MEMBER ZIEMER: Yes.

MR. FITZGERALD: -- which was almost like a capped crawl space.

MEMBER ZIEMER: No, you're saying source term.

MR. FITZGERALD: Right.

MEMBER ZIEMER: But the volumes could be --

MR. FITZGERALD: With the --

MEMBER ZIEMER: -- the room volumes could have been small, I suppose.

MR. FITZGERALD: Right. And the concentration that was going on with the

negative pressure, the question would be, you know, whether you would be seeing a much higher dose -- a much higher concentration level, which is sort of, and this is a little and/or, because you only have this one individual that they actually did the lung counts on. But they're picking up the radon daughters in his lungs. And they waited, actually took him out of the area, and waited, and it gradually went down.

But so, it was, I would think, fairly hot in that particular area. The question is, how broadly do you want to define that area.

MEMBER ZIEMER: Right.

MR. FITZGERALD: Because it was only one sample taken, it is hard to characterize that area.

MR. ULSH: Well, that's the -- if I'm thinking about the right guy, that was the guy that was sitting, had his office right on top.

MR. FITZGERALD: In fact, he was sitting on top of the hole.

MR. ULSH: Right.

MR. FITZGERALD: So, you know, he was probably the maximally exposed individual. It may not -- it's not clear you know, how many other people were in the area and how many other adjacent rooms were involved. But there's no question, at least he was getting dosed to the point where it was showing up in his in vivo counts, and from radon, which, yes, they thought it was plutonium event that they were dealing with. It turned out to be radon event.

So, you know, that's the implication of trying to figure out. If you only have one sample, is it possible to go back and come up with a surrogate, or a representative sample? I think it's a reasonable approach. And if you can get the 1960s progress reports, I think that would be even closer. I'm a little concerned about

the pre-1960, because I'm not so sure -- this is your question -- I'm not sure if the operating phase of the cave and the measurements in these adjacent facilities would necessarily be the same as that.

It might be. It might be even be more. But I'm not sure. That's hard to figure.

MR. STEWART: We have three different types of results. Depending on where you look in the data, we have the cave ventilation itself, and then we have the access area behind, what they call the high-risk area. The cave itself wasn't accessible in terms of you know -- and then they have a low risk area. They have three gradations of samples. And they are called out specifically in some spots. And they also do the corridors, and they do some results in R building, too.

R building is not necessarily, it's not over top of the cave site. It's an

adjacent building. But it, I believe what you're seeing there is the same source term, but it's a limited processing going on there.

MR. FITZGERALD: With more dilution.

MR. STEWART: Yes. Not necessarily the cave itself. So there are different results that you're going to get. So you have your choice of all them. I don't think it's plausible to assign somebody the, you know, the air concentration that they're measuring at the exhaust stack for the cave, for example.

You just got to go pick a maximum number that you like.

MR. FITZGERALD: Well I'm just saying, I don't -- without having any supporting data, it's hard to pick. Because you know, it's sort of like, this individual, four individuals in SW, had their own exhaust stack essentially. Because of the pressure gradient, they were actually getting -- and

you know, getting it through the fissure, or whatever they had over the collapsed cave. So, in a sense, they were getting continuous source.

Now my question is, how much was coming through. But we'll find out a lot.

MR. STEWART: Yes, it looks like a lot.

MR. FITZGERALD: It's sort of conjecture to say, well, how much is a lot. And I understand your issue is, at some point, it's moot.

MR. STEWART: Yes. Yes.

MR. FITZGERALD: So, I don't -- that's another argument to say, well, you know, we don't know, but we're going to go ahead and assign this. But clearly, it's overkill.

MR. STEWART: Yes. There is a point at which latency issues begin to limit compensability. For instance, if you have a very short latent period between exposure and

the diagnosis of lung cancer, say 30 days wherein you were exposed to a large amount of radon, 30 days later, you're diagnosed with cancer, then the probability of causation, no matter how high the dose, is going to be essentially zero. And it plays out according to the epidemiological tables over five years or so for most cancers, I believe. I'm not an expert on that.

MR. FITZGERALD: But again, you know, the other question, too, is that it's hard to, outside this one individual, know what was -- what individuals are resident to the area in question. I mean, I hadn't seen anything that kind of gives you an idea of - because SW was, you know, probably a major process area. And who knows. So I don't know how that would, you know, how one would apply that, either.

MR. STEWART: It's always problematical, because there are always different levels of information available in

a case. You may have a very detailed work history for the individual from a telephone interview, and you may have very little.

So typically, our approach is to a little more sweeping, and that is, you know, all personnel assigned to R and SW, for example, would be one way to approach it. We can typically get to that level of detail based on bioassay records, and on external dose monitoring. If they have neither one of those, we can be pretty sure that they didn't work in R or SW.

MR. ULSH: Well, and due to the nature of the exposure source, and we're only talking about radon. So really, we're only talking about lung cancers. And really, we're only talking about non-compensable lung cancers, or the ones that are non-compensable right now. So, that's a pretty small handful of claims.

MR. STEWART: We haven't looked at that for some time because we have, we're up

to almost 28,000 cases now.

MR. ULSH: Well, yes, but --

MR. STEWART: Yes. No -- yes, fewer than ten that were not yet compensated. And some of those had not been processed as yet.

MR. FITZGERALD: So, you're still working this up. But from a plausibility standpoint, you would have to draw some parallels with comparable measurements or concentration levels to probably, you know, the limited data that exists for that one location.

MR. STEWART: Possibly, but we may be looking at an unprecedented amount of radon. We have to be ready for that conclusion. In fact, the cave facility was a substantial dollar investment that was scheduled to be reused for other processes, but in fact, was demolished and disposed of just as a result of this radon problem.

So, you know, they certainly changed their minds about health protection

as a result of this process.

MR. FITZGERALD: Well, that's the issue of how one brackets the issue in terms of the data that's available, I think is the thing that I'd be interested in. I think the data itself suggests there's a lot of data, but how it would fit into that analysis is the challenge. I'm not sure one can. It might turn out that there might be some data from the later periods that would be closer.

MR. ULSH: So if I hear you correctly, Joe, and if I could summarize, perhaps, there are two concerns that you have at least so far looking at the data that's available right now.

One is applying the radon measurements from the earlier time period to the later time period. In order to do that, should we decide that we need to do that, we would have to discuss whether or not the earlier data is number one, representative, or number two, bounding. We'd have to make

the case that it is in order to be able to do that. If we find the health physics progress reports, and they do indeed have data for that later time period, then that issue kind of goes away.

The second issue though is, let's just assume that we have the data that we had in the earlier period, and we have that data for the 60s once we find it. Then we have to make the case that these areas that were measured are indeed applicable or bounding, you know, across the site, or you know.

Have I summed up your two concerns?

MR. FITZGERALD: Yes. I think the first is clearly one where you can come up with a surrogate means of assigning a -- a concentration value to others getting seen there -- and the second thing, I think clearly is one of the defining what the bounds are. And we're not clear on how extensive the problem was in SW and whether

it -- well, it was formerly in R. We didn't see anything definitive, but we had an interview where a tech said, yes. His counter went off, you know, went off scale over a fissure in R.

So, you know, clearly there's some implications for R, as well. So this discussion of bounding the issue both ways would be an issue.

MEMBER CLAWSON: Well, the area -- because in the interview - and correct me if I'm wrong on this - when we were discussing this, when they found that fissure, they found the amounts that they found, they didn't look any other place. They looked -- they went, and the result with generation of where it was going, which ventilator, that whole system, but they never checked into where there was any other fissures or anything else.

Because I guess this went through all sorts of different buildings and so

forth. They had issues with radon in numerous places. They - and my understanding is they blamed it on the coal fired generating plant down the road that did a lot of different things. But from the interview, and I guess this is what I found interesting, was once they saw the levels they did, they never did any more investigation, because when they figured out where it was coming from, they ventilated that. So they never looked into any other areas that it would have been feeding into the building, different parts of the building.

MR. ULSH: We're kind of back to the same issue that we were talking about this morning in terms of how tightly you can go out of circle. And for people who didn't work at Mound, myself included, we can talk about R building, we talk about SW building, it's really one building.

MEMBER CLAWSON: Yes. Right.

MR. ULSH: So I think from this

particular source term, the biggest circle would be all of R and SW building. Can you draw the circle tighter? Well, I don't know. We'll have to make a case for that.

MS. ROBERTSON-DEMERS: You're not throwing building 21 in here?

MR. ULSH: Building 21, the storage facility on the -- near the plant boundary? That was an unoccupied storage building. I mean, people went in briefly to do the routine surveys, but it wasn't an area that was routinely occupied.

MR. ALVAREZ: This is Bob Alvarez. The environmental surveys through that building indicated significant depositions from radon/thoron emissions.

MR. ULSH: That wouldn't necessarily surprise me, considering that they had thousands of drums of thorium stored in that building. Well, it wasn't the drums. Actually, they emptied the drums into building 21. So that wouldn't surprise me.

But the point is is that that building itself was unoccupied, and it was geographically removed from the rest of the site. It was near the site boundary. And there was a fairly large area between.

MR. ALVAREZ: Yes. I mean, I think that that building probably had workers there in greater numbers when they were putting it there, and repacking it to remove it.

MR. ULSH: Yes, I agree that we probably have had the maximum number of workers when they were doing -- when they were emptying the drums into that building.

CHAIR BEACH: Didn't they do the redrumming in that building also where they --

MR. ALVAREZ: Yes. They had -- they found a customer, of course in the mid-70s or late-70s, and eventually got shipped off site.

MR. ULSH: Well, we're talking

about a couple of different operations here. Yes, that did happen, Bob, where they found a customer. The customer came on site and removed that material.

But prior to that, in 1955, Mound received -- well, late 1954, and in 1995, they received quite a large amount of thorium residues, Brazilian oxide residues and some other materials, in anticipation of a thorium pilot plant. That thorium plant never actually came to fruition. The project was canceled, and then Mound was left sitting there with all of these thorium residues.

And some of those drums were in very poor condition, and they had to be repackaged, some of them a number of times. So I think that's what Josie was asking about --

CHAIR BEACH: Right.

MR. ULSH: -- those earlier repacking operations. In fact, the thing that lead to construction of building 21 was

the problems that they were having with these thorium drums deteriorating. So they built building 21, and dumped all the stuff into that building.

So I don't -- I can't remember off the top of my head exactly where the thorium redrumming operations occurred. I don't think it was in building 21, because building 21 wasn't built until later. It was done outside.

CHAIR BEACH: Yes, I remember the discussions, but don't remember the building.

MR. FITZGERALD: It was done outside.

MR. ULSH: Yes.

MR. FITZGERALD: 21 was built with outside venting because of the thoron problem.

MR. ULSH: Right.

MR. FITZGERALD: But again, I think that would have been maybe a periodic exposure, but it wouldn't have been very

long. I mean, workers went in, went out. I think it was a pretty known issue on the thoron.

MR. ULSH: Yes.

MR. FITZGERALD: Anyway.

MR. ULSH: I think the significant radon issue is going to be related to the old cave, and the environs around, and the R and SW building.

MR. FITZGERALD: That's pretty much -- I think you've captured it.

MR. ULSH: So as an action item, I'll volunteer before you even -- we are pursuing the health physics reports from the 60s.

CHAIR BEACH: Right.

MR. ULSH: When we locate those, if any redaction is necessary, we'll work with DOE to accomplish that, and then we'll make you all aware that that's available.

MR. FITZGERALD: Yes. The only issue on that, whether, you know, you have a

freshly capped source like that, whether the actual exhalation came about through later, you know, fracturing, you know. These things typically are pretty solid in the beginning, but they over time fracture. And whether that was the -- so measurements right after it was capped may not necessarily reflect the circumstances five, ten years down the road.

I'm just throwing that out. I'm not saying I know anything about it, but --

MR. ULSH: Yes.

MR. FITZGERALD: -- if it looks real clean, I wouldn't necessarily assume that that was the case throughout.

MR. ULSH: Well --

MR. STEWART: It didn't look all that clean.

MR. FITZGERALD: What's what?

MR. STEWART: It didn't look all that clean.

MR. ULSH: Well, the D&D in the old cave a number of times, but I think the

final time was in 1959. So, yes. If you had data from say, 1960, or even 61, that may not be representative of later in the 60s.

MR. FITZGERALD: A little later in the 60s, I think I'd be more comfortable that that's probably more reflective.

MR. ULSH: Yes, we're looking for these reports throughout the 60s. So we'll let you know when and if, hopefully, we find them.

CHAIR BEACH: Are you coming up with a white paper on that, on the radon issue also?

MR. ULSH: Yes.

CHAIR BEACH: Any idea of time frame?

MR. ULSH: Don't say next year.

(Laughter.)

MR. ULSH: You know, a lot of it, Josie, is going to depend on when we actually are successful in locating these progress reports.

CHAIR BEACH: Those -- right.

MR. ULSH: That's kind of the necessary precursor to it.

CHAIR BEACH: That makes sense.

MR. ULSH: I am hoping that it will be in advance of the next Working Group meeting. But it really depends on --

CHAIR BEACH: I understand. So I won't look for a date on that then. And the other item, if there's no more on radon, is the roadmap issue.

MR. ULSH: Yes. The action item that we had on the roadmap was, at the last Working Group meeting, it was requested that we add in some information to the roadmap with regard to the incidents that occurred, and where information on those incidents could be found.

Sam Chu of the ORAU team did, in fact, go in and add that information in, and that was the only minor change on the roadmap that we made this time around.

CHAIR BEACH: We did ask for hot cell descriptions under that same item. Those were made available, weren't they? The drawings, were you able to locate anything on that?

MR. STEWART: Well, I was not able to identify detailed drawings of that, which kind of surprised me, because they worked with that fairly late.

CHAIR BEACH: Yes.

MR. STEWART: I did talk to some people who had worked with it. They actually -- the drawings of the cell itself are present on drawings made in the `50s and `70s -- `50s? No. `70s and certainly in 1991. Yes, that's the old cave.

The hot cell is what they refer to as the new cave, and it basically was an isolation cell - Brant's talked about this before - and the idea was that it would be less permeable to radon. We have a drawing of it, and we have some dimensions. I'll

just read you what I have.

It's an isolation cell in SW-140. The cell itself is including a -- included on drawings of the SW building, first floor, dated `73 and `91. The new cave area actually is a suite of rooms that encompass the areas surrounding the isolation cell, and it includes a number of different rooms in SW. I've got a list of them here.

But the new cave area, when you see that referred to informally in a narrative, it could be talking about the isolation cell, or it could be talking about the room surrounding it. SW-140, the room where the cave actually was, had fume hoods in it, and some lab benches. The adjoining room, SW-120 -- or, SW-22, had glove boxes around the periphery of the room, and a work area in the middle.

One of those glove boxes had a pass through to the isolation cells, so that they could put things in and out through that

glove box. Let's see what else we have here. If you look at that hot cell, you would see two large windows, very thick windows. People here are probably familiar with those.

MEMBER CLAWSON: Lead shielded.

MR. STEWART: I don't know that they were lead shielded. I would assume that they are, but I haven't found data that shows that to be the case. There are two manipulator arms there by the windows, and in-line filter for the ventilation exhaust. Also on that wall were two air samplers for the operators of the cell.

On the other side of the hot cell was a door, an access door you could actually go in, and that was room 136. So you could actually enter the cell. This room, later in its operational history, was always accessed on respiratory protection. So it was not a clean area, even in the outside part of the cell. I mean, you had to have a mask on to be in the new cave area and

operating the manipulators.

So really all I was able to give you is a kind of a qualitative description.

CHAIR BEACH: I think that's what brought the question up at the last Working Group meeting, and I think, Brad, you were kind of the lead on that --

MEMBER CLAWSON: Yes.

CHAIR BEACH: -- and I think because --

MEMBER CLAWSON: We were trying to look at the ventilation system, and try to figure out how they to have this design because I guess I keep getting confused when we're talking about these documents and so forth, have them going into the new cave and doing this and this. And the next one they're in respirators and stuff, but there's no determinating -- it's kind of vague to me. I really had a hard time following it, because it seemed like, in some senses, they encompass this whole section of it, they

called it the new cave. And in other ones, they were calling them hot cells. And they were basically the same thing, is what I was being told. But I'm wondering if the center portion of it is what they were classifying as a hot cell.

MR. ULSH: I think that's the case. The hot cell is inside the new cave.

MR. STEWART: Yes. The hot cell is inside a suite of rooms that's called the new cave.

MEMBER CLAWSON: Right. And that -- I guess that's where I was getting into problems, because I was picking up in that they, like you just said, that they were respiratory, even on the outsides. And I was trying to figure out what the -- how the ventilation system worked.

Because in talking with some of the interviewers, and stuff like that, this add-on to this building and then add-on to this created quite a problem with

ventilation. Those outer suite of rooms that you said were supposed to stay clean, but they didn't. And this is why I was looking into the flow pattern of -- that's why we were trying to find these prints and stuff like that, because those outer rooms were to be cleaned, and then they ended up --

CHAIR BEACH: And were they ventilated?

MEMBER CLAWSON: And how they -- yes, how they ventilated. And part of the issue in my -- and you've got to understand, I'm taking this just from some of the interviewers of some of the maintenance people, and so forth. We discussed these buildings were added one onto the other and back and forth, and the ventilation systems didn't quite match what the facility needed. And so they had -- that's where it got into a lot of this spread of contamination issues.

That's why I was really trying to visualize what they were talking about, and I

had a hard time.

MR. ULSH: Okay. I've got a couple of thoughts on that, Brad.

I think I had some photographs of the new cave facility. I have to go back and locate those, and I'll get those to you. That may not entirely answer your question, but it'll give you a little bit of a visual.

MEMBER CLAWSON: What I was really trying to look at, because it was a surprise from what I read, and some of the documents and so forth, from the Mound Museum and stuff, that it was a surprise that all of a sudden these other rooms started, and they come to find out that they had ventilation issues, and I guess there was a pass-thru path to the old cave that got into some issues, too. And that's why I was trying to get an overview of what we actually had here.

The main thing I was looking at is the flow pattern for the air and so forth like that. Later on, I know that they made

some more modifications to try to get a handle on what the issue was.

MR. ULSH: I know that the --

MS. ROBERTSON-DEMERS: I've got a suggestion. In the mid-1990s, they went through room by room in buildings, and did air flow studies with smoke. And I don't know if that's available for that area. I would assume that it was because, at least for our building, they did it for every laboratory.

And it was for the purpose of making sure that things were positioned, and there should be a diagram that was prepared by the person who did it that will show you the air flow.

MEMBER CLAWSON: Because what time period did the new cave come online? Do you remember what that was?

MR. ULSH: Well it was after the old cave, and the old cave was ended in 1959, so it probably would have been early to mid-

60s.

MEMBER CLAWSON: Okay. Because what I got was that there -- this was a reoccurring issue, contamination issues and so forth with these caves, and where they spread and where it went. And that this -- I guess it's called a -- it was actually a pipe chase or something between the old cave and the new area.

MR. STEWART: Pipe chase? I know that that's a case.

MEMBER CLAWSON: I wouldn't say it's a pipe chase, but --

MR. ULSH: Right.

MEMBER CLAWSON: This is where they had the radon issues.

MR. STEWART: Yes. It's --

MEMBER CLAWSON: I call it a pipe chase. You got to realize, each -- I call it access tunnel, whatever you want to be able to call it.

MR. STEWART: Yes. I have not

seen evidence of that on the drawings that I've seen. I have a construction drawing from an as-built in the `50s that shows the new cave. Yes, sorry, `50s.

The new cave, actually, the first operation we have starting in there is `66, although one source gives that date as 1960. King says 1960, and I believe he is incorrect in that assumption. But it looks like operation started in `66 in the new cave.

I haven't seen anything underground, under the slab, under the floor level from the old cave to the new cave. Not to say that that's not a possibility, I just haven't seen evidence of that. If you look at a drawing of the building, SW-1, which later became SW-19, had a hallway from it that went right down to the new cave area. So it certainly was easy to access from that side.

MEMBER CLAWSON: I mean, this is

trivial, but we just found out a week ago that two of our facilities were connected by pipes, and now we have 23 people moving up to just last week. We now know it. We never knew any of these pipes' distance. And this is why it's such an interesting issue to me is because we have the same thing at our site of buildings being added onto buildings and so forth like that, and it's kind of a convoluted mess of stuff.

And these came out in the interviews and so forth like that -- but these - we kept referring to them as communicators and so forth - they came up, and they said, the outside area is supposed to have been cleaned. It ended up respiratory. Now there was a lot of issues to it, flow ventilation and so forth like that, and we kept having experienced contamination. That's just why I wanted to get a handle on an overview of what were we looking at here. I don't know what we can do

on it, but --

MR. ULSH: Well, I think there's three things that we can probably do. Number one, I can go try to find those photographs. And that will at least give you the visual representation.

MEMBER CLAWSON: Right.

MR. ULSH: Number two, if I could ask, Kathy, if you could perhaps just put in an email any information that you can think of that would help us locate that study that you're talking about, you know, that ventilation study in the early `90s, and we can look for that.

And number three, I can go do a targeted search. There's a number of blue prints available at the Mound Museum that we really haven't messed with too much.

MEMBER CLAWSON: Right.

MR. ULSH: And we can go look and see if we can find any blue prints related to the old and new cave in relation to the R and

SW building.

MEMBER ZIEMER: And that's where you run into the problem. The blue prints and the as-builts are often different, and I think that's what you're talking about.

MEMBER CLAWSON: Yes, very much so.

MEMBER ZIEMER: So, if you pull a blue print, you've got to make sure it's an as-built, and not a design that somebody said, well, that won't work, so let's leave these pipes in there and add something.

MR. ULSH: Well, I know just the guy who can help me look through these blue prints. I don't know what we'll find, if anything, but we'll look.

MEMBER CLAWSON: Yes, and I'd just like to -- I'd like to be able to look, because there's a lot of -- almost all the -- most of the interviewees that we've interviewed and talked with and so forth have comments about the new cave and old cave and

how they were set up, and they were trying to explain to me how these buildings were added on, and new processes would come in and tied into other stuff, and it was -- it would be pretty hard to follow. And I visually couldn't see what -- half of what they were -- I got a rough estimate. But if we could find anything --

MR. STEWART: There are excellent building descriptions for some, even many of the buildings at Mound, but I have not been able to locate them on that one, one of those for either R or SW. I would make -- certainly make this job a lot easier if we do that. Because they're quite detailed, and have photographs and diagrams. But I haven't found that yet. Could it be in the classified room?

CHAIR BEACH: And Brant, you said Mound did update the old drive, or update the roadmap?

MR. ULSH: Yes.

CHAIR BEACH: Can we get a copy of that? Do we have to do download it from the --

MR. ULSH: No. We got it.

CHAIR BEACH: I've got some questions about that.

MR. ULSH: I had forwarded it by email, but it --

CHAIR BEACH: I didn't get it by email.

MR. ULSH: You didn't?

CHAIR BEACH: No. I believe it's on O drive, but I'm not going to have access. On the 20th, you did deliver to the O drive. I'm wondering, can I get a copy of it, since I won't have access for a couple of weeks?

MR. ULSH: Sure. Sure, yes.

CHAIR BEACH: Great. If you don't mind.

MR. ULSH: I'll put it on a disk and FedEx it to you.

CHAIR BEACH: Okay. And then we

talked about -- you had other questions on the roadmap?

MS. ROBERTSON-DEMERS: I did.

CHAIR BEACH: Sorry.

MS. ROBERTSON-DEMERS: First of all, is there a classified version of it?

MR. ULSH: There is a version that contains more detail that we're not circulating.

MS. ROBERTSON-DEMERS: Which includes information from appendix B? The King document?

MR. MORRIS: We haven't -- we haven't updated from appendix B yet.

MR. ROLLINS: Will that version be on the O drive?

MR. ULSH: If it is, we're in trouble.

MR. ROLLINS: Okay.

MS. ROBERTSON-DEMERS: So, how can we -- cleared people view that, how can that be made available for those --

MR. MORRIS: As I understand it, we have not -- our most recent updates of the SRDB to the incidents -- the SRDB contains some separate documents describing incidents. And most recent thing Sam Chu did was to put pointers from the unclassified version of the roadmap, or the less sensitive version of the roadmap, to the SRDB. I don't think he did that on the older, more detailed version that we are not keeping up to date.

I think all we've done is maintain the newest version that has less -- that has been sanitized to some extent.

MR. FITZGERALD: And this does encompass appendix B?

MR. MORRIS: It was not -- we've read appendix B at this point, but we haven't worked with it to the fourth templates done as I understand it.

MS. ROBERTSON-DEMERS: Can you tell us where the location of that appendix B document is, where you update it?

MR. ULSH: We already have. Theresa Fowler in Albuquerque has it. I even object to that fact, but --

MR. FITZGERALD: Well, we don't -- I guess the question is, it's just getting a shipped copy as we can deal with them directly.

MR. ULSH: Let's talk about that afterwards.

MR. FITZGERALD: Okay.

MR. ULSH: Because I can give you some ideas on how to get that.

CHAIR BEACH: Does that cover also the roadmap? Is that part of this discussion for Issue 6?

MR. ULSH: What is Issue 6?

CHAIR BEACH: Issue 6 is the metal titrites, and there was a NIOSH action. So this is -- is that part of it, or -- Because there was going to be a separate roadmap that you guys agreed to come up with on that.

MR. ULSH: How about we --

CHAIR BEACH: That's fine. Anything else on the -- ?

MR. FITZGERALD: Yes. Ron, are you still on? Ron Buchanan?

MR. BUCHANAN: Yes, I'm here.

MR. FITZGERALD: Okay. Did you have any questions on the claimant cases that dealt with the shallow dose issue?

MR. BUCHANAN: Not really questions. I guess at this point, SC&A needs to know of the Working Group's position on whether this should be pursued any further. Just a quick recap here, as you recall, the shallow dose was not measured in a long period of time, and must be -- the film showed some darkening, and then the person might read it. There was no set standard and no calibration for the shallow dose, which would include the electrons and low-energy photons, and differentiating those from the deep dose.

And Mound did not have an accepted

calibration system up -- they didn't start calibrating at all until like `79. And it wasn't -- still had some problems up into the `88, one of the -- did not meet the DOE lab requirements even then. So I guess my question is, I looked -- NIOSH sent about 100 cases from Mound that had skin-type cancer. And so I went back and looked at a few of those cases, and certainly not all hundred of them. And went back and looked at a few of those cases, and they are using the electron dose as recorded, if there was some recorded, and if there's not, they're generally assigning mis-dose.

Now in some cases, they don't use shallow dose because they have a greater than 50 percent POC without it, so they don't use it. But in some cases, they are using their recorded dose if there was one there, or assigning a mis-dose in some of these cases. A couple of them were not -- they were denied because they didn't reach the 50

percent.

And so I guess at this point we would

-- SC&A needs to know if the Working Group wants to pursue any further on the shallow dose, if that's an SEC issue, or where we want to stand on that.

MR. FITZGERALD: And I think this goes back to comments that were made that, you know, certainly there's some issues there, but in the final analysis, the skin cancer wouldn't necessarily be an SEC relevant cancer. So I don't know. I think there was a little bit of a, you know, whether this should be pursued, but I think that is appropriately something that ought to be discussed before we expend any effort trying to chase all these cases down. It's not a small job. You know, because it's not going to lead to some resolution on SEC context, maybe it's not a good use of resources.

MR. ULSH: Well there were a couple of action items that we had. One was to provide that list of cases to you for which shallow dose would be relevant, and that includes primarily skin cancer, but a few others as well. And that list has been provided.

The other action item, I believe, was for us to provide -- I don't know, we keep using the term, roadmap, but a position paper, or some way how we're going to handle estimated shallow doses at Mound. We have not yet provided that. We will do so. That's a deliverable for us for the next Working Group meeting for sure.

CHAIR BEACH: That did not make the list either, under 16.

MR. ULSH: Well it's somewhere after that, I'm sure.

MEMBER ZIEMER: You took it as an action.

CHAIR BEACH: Perfect. So I would

like to defer that until you provide that paper, and SC&A has a chance to maybe look at some more of those claims. I don't know. How does the rest of the Working Group feel on that one?

MEMBER ZIEMER: Did you say that you had provided us with a list of the cases?

MR. ULSH: Yes Paul, and unfortunately, I neglected to include you, because I forgot that you're an alternate. So I will go back and get all those emails that I sent out on Monday, and forward them to you, as well.

MEMBER ZIEMER: Okay.

MR. ULSH: But yes, that is available on the O drive in the Mound area.

MR. FITZGERALD: This sounds like --

MEMBER ZIEMER: Approximately how many were -- are we talking about here?

MR. ULSH: Well, Ron gave the number of about 100. That sounds reasonable

to me, especially if it was laid out so that each row was not an individual person, it was an individual cancer. So as you know, in a lot of cases where you have a skin cancer, you don't have just one. So there's numerous rows associated with one particular person. I'll take Ron's number at about 100.

MR. BUCHANAN: Yes I counted there are about 108. There's a lot of lines there, but like you say, Brant, there -- skin cancer, someone has like four or five, or six. So I think a total of 108 cases.

MR. FITZGERALD: Well I guess responding to what you're raising, Ron, it sounds like we should hold and wait for this white paper, whatever it's going to be. This is an illustrative sample of what's been done, but it sounds like this will be a little bit more definitive as to what the approach is.

CHAIR BEACH: Bob can you hand me -- so this is the list that Brant actually

sent out, all five pages of the data? I think 16 is the first one.

MR. FITZGERALD: Josie, we're going to hold on, you know --

CHAIR BEACH: Yes. MR. FITZGERALD: -- that part of it, and wait until we approach it.

CHAIR BEACH: Okay. So the next part of this is to determine what priorities we need to set for future meetings, and I think it might be a little too early to set a future meeting, unless -- because I know there's a couple things hanging. I think that would be tough to do.

But I kind of wanted to ask the Working Group what priorities they wanted to have NIOSH pursue out of these items. If you have a chance to maybe think about those.

MEMBER SCHOFIELD: Well Josie, I'm kind of looking bad on that whole issue about the ventilation, particularly with the new structure versus the old structures there.

Cave, the new cave.

CHAIR BEACH: Yes.

MEMBER SCHOFIELD: And I think that needs to be looked at a little better.

CHAIR BEACH: Okay. Some of the ones that I came up with, and we can discuss them, of course, is a priority would be Number 9, the -- Number 9, 14 and 15, the neutrons, and then I threw in there the internal/external. I know we're waiting for SC&A to deliver a report on that very soon, I'm understanding.

MR. ULSH: What about shallow dose, where does that fit into your priority?

CHAIR BEACH: Well, that's up for discussion. I just didn't -- I know we have a lot of matrix items out there, and you had asked at the last meeting to which ones we wanted you to concentrate on. So I think you saw my list. They're all high.

MR. ULSH: Yes.

CHAIR BEACH: And we can continue

as we have been, unless there's other ideas.

MEMBER ZIEMER: Well to what extent do you have to focus on a linear fashion, I mean, can you give us a feel for it? Is it really happening that way, or do some of these inform each other so that it helps to work on multiple -- you're looking for certain kinds of information, and other information will be there at the same time, or what?

MR. ULSH: Not necessarily.

MEMBER ZIEMER: Work-wise, what makes sense?

MR. ULSH: It's not necessarily that case, Paul, where we have to finish one before we do the other in a serial fashion. It's not really that. It's a matter of balancing priorities.

MEMBER ZIEMER: Yes.

MR. ULSH: We only have, you know, so many people available to work on this, and we want to focus on the things that are the

most important to you, and perhaps defer the other ones until later. If you tell me that they're all high priority, well then, we'll get the resources from somewhere, and we'll jump on all of them.

But it's not so much the case of we have to do these in serial rather than parallel.

CHAIR BEACH: Any other ideas?

MEMBER CLAWSON: I want radon, the lung, I guess mainly in that building and so forth. I think that one can be kind of done in conjunction.

MR. ULSH: So the radon issue is high priority. And that encompasses, Brad, your concerns about the different layouts of the buildings.

MEMBER CLAWSON: Yes. And I realize, you know, we're trying to reconstruct a lot of stuff. I realize that we may not be able to do that. It's just in the earlier documents, and so forth like

that. In the interviews, it portrayed that -- and I don't know how else to put it. These buildings were kind of bastardized together, and they never knew -- they didn't understand where they came out and so forth like that. They were put together poorly. So you know, that is a big issue for me. I'd set it as high priority, but --

MR. ULSH: And Josie, some of the other issues that were discussed today, and it might be good to get into the overall priority, is high or low, or --

CHAIR BEACH: Yes.

MR. ULSH: Plutonium-238 issue.

CHAIR BEACH: Yes.

MR. ULSH: And Price-Anderson Act issue. I don't know, you might have mentioned this earlier, the issue 17 badging issue. Is that what you were talking about when you said internal and external, and you're expecting --

CHAIR BEACH: No. That was issue

11, 11-12. So they just -- the report that's coming out on that issue.

MR. ULSH: Okay. So there's another one, on issue 17. If you guys have some feel for what your priorities are, we can focus our resources on those.

CHAIR BEACH: I think the neutron is a high priority, too, or should be considered one that needs to be addressed.

MR. ULSH: Okay.

CHAIR BEACH: Of course, those are all the ones we've talked about at this time, too and --

MR. ULSH: Neutrons and radons so far is what I've heard.

CHAIR BEACH: Neutron, radon and the ceramic, the Pu-238.

MR. ULSH: Okay.

CHAIR BEACH: I just wanted to make sure we were all kind of on the --

MEMBER ZIEMER: Is that actually the modeling part?

CHAIR BEACH: Yes.

MEMBER ZIEMER: I think that would be an important one to get a handle on.

CHAIR BEACH: Yes. Are you okay with that?

MEMBER ZIEMER: Perfect.

CHAIR BEACH: I guess we carry on then. We're a wrap. So is there anything other? We can adjourn.

MR. KATZ: That's a wrap. So the Mound Work Group is adjourned.

(Whereupon, the above-entitled matter was adjourned at 2:22 p.m.)