UNITED STATES OF AMERICA
DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

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NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH
ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON MOUND

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MEETING

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WEDNESDAY, MAY 27, 2009

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The Work Group convened at 9:30 a.m., in the Zurich Room of the Cincinnati Airport Marriott Hotel, Josie M. Beach, Work Group Chair, presiding.

MEMBERS PRESENT:
JOSIE M. BEACH, Chair
BRADLEY P. CLAWSON
PHILLIP M. SCHOFIELD
PAUL L. ZIEMER *

MEMBERS ABSENT:
ROBERT W. PRESLEY

ALSO PRESENT:

NANCY ADAMS, NIOSH Contractor
TERRY BARRIE*, ANWAG
BOB BISTLINE, SC&A
ELIZABETH BRACKETT*, ORAU Team
RON BUCHANAN, SC&A
MELTON CHEW, ORAU Team
LARRY ELLIOTT, NIOSH
JOE FITZGERALD, SC&A
EMILY HOWELL, HHS
KARIN JESSEN, ORAU Team
MATT KAPLAN*, Senator Brown's Office
THEODORE M. KATZ, Designated Federal Official
TOM LaBONE*, ORAU Team
GREG LEWIS, DOE
JOYCE LIPSZTEIN*, SC&A
JOHN MAURO*, SC&A
JAMES NETON, NIOSH
GENE POTTER, ORAU Team
KATHY ROBERTSON-DeMERS, SC&A
MUTTY SHARFI, ORAU Team
DON STEWART, ORAU Team
BRANT ULSH, NIOSH

*present via teleconference

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

9:33 a.m.

MR. KATZ: Well, good morning everyone in the room and on the line. This is Ted Katz. I am the Acting Designated Federal Official for the Advisory Board on Radiation Worker Health. And this is the Mound Working Group and we are convening.

And the first order of business is to run roll call. And we will start with Board Members in the room. And please, everybody, with roll call also indicate whether you have a conflict or not. And let me just note that one member, Bob Presley, is not going to be in attendance for most of this meeting, although he said he would try to call in. And Dr. Ziemer who is the alternate for this Working Group, I believe, is coming but he is on the road. He may be on by line. So, let's begin in the room with the Board Members.

CHAIR BEACH: Okay, I am Josie

Beach. I am the Working Group Chair and I have no conflicts.

MEMBER CLAWSON: Brad Clawson, Advisory Board Member. No conflict.

MEMBER SCHOFIELD: Philip Schofield, Advisory Board Member. No conflict.

MR. KATZ: And on the line, Paul, are you with us by phone?

(No audible response.)

Okay, so let's carry on with roll call in the room, NIOSH ORAU team.

DR. NETON: Jim Neton, OCAS. No conflict with Mound.

DR. ULSH: This is Brant Ulsh with OCAS and I have no conflict with Mound.

MR. SHARFI: Mutty Sharfi, ORAU team, unconflicted.

MR. STEWART: Don Stewart, ORAU team. I am not conflicted with Mound.

MR. CHEW: Mel Chew, ORAU team, I am not conflicted.

MR. KATZ: And on the line, NIOSH ORAU team?

MS. BRACKETT: This is Elizabeth Brackett with the ORAU team and I do have a conflict with Mound.

MR. KATZ: That is Elizabeth Bracket. She says she has a conflict.

Anyone else NIOSH ORAU team?

MR. LaBONE: This is Tom LaBone and I have a conflict with Mound.

MR. KATZ: Tom LaBone, also conflicted.

Okay, in the room then, SC&A.

MR. FITZGERALD: Joe Fitzgerald. I don't have a conflict.

DR. BISTLINE: Bob Bistline. I don't have a conflict.

MR. BUCHANAN: Ron Buchanan. I do not have a conflict.

MS. ROBERTSON-DeMERS: Kathy Robertson-DeMers, conflicted.

MR. KATZ: Okay, then on the line

for SC&A?

DR. MAURO: John Mauro, SC&A. No conflict.

MR. KATZ: Welcome, John.

DR. LIPSZTEIN: Joyce Lipsztein, SC&A. No conflict.

MR. KATZ: Okay, then in the room -- well, we don't -- oh. Federal officials or contract staff in the room.

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

MR. KATZ: And on the line, any federal officials, federal contract staff.

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

MR. KATZ: That's Nancy Adams.

Okay, and then members of the public in the room.

(No response.)

MR. KATZ: Okay and on the line, any members of the public who want to self-identify or any staff for congressional

offices?

MS. BARRIE: This is Terrie Barrie with ANWAG.

MR. KATZ: Welcome, Terrie.

MS. BARRIE: Good morning.

MEMBER ZIEMER: Ted, it is Paul Ziemer. I'm on the line now.

MR. KATZ: Oh, glad to have you. Welcome, Paul.

MR. KAPLAN: This is Matt Kaplan from Senator Brown's office, listening in on the call.

MR. KATZ: Welcome, Matt. Senator Brown's office.

And, Paul, you didn't note a conflict.

MEMBER ZIEMER: No conflict.

MR. KATZ: Thank you. Okay, I think that does it for roll call. Then just let me just remind everyone who is on the line, if you are on the line, to please when you are not speaking, mute your phone. And if

you don't have a mute button, use *6. And please disconnect; don't use your hold button. Just disconnect. And we just got someone's something. A TV show.

Someone on the line, I think you may have hit mute. Please don't do that again because -- or don't hit hold, sorry, because it disrupts the call. Thank you. It's all yours.

CHAIR BEACH: Okay, thank you, Ted. First of all, I want to say good morning and welcome to the Mound's fourth Working Group meeting. And I would like to thank NIOSH ORAU Team, SC&A, and all the Work Group members for all of the work that has gone into preparing for this two-day meeting.

A couple of agenda item changes or additions, actually, that I need to make note of. Today, if you would add, I think most of you in the room have it, at the end of the day after Price-Anderson related bioassay, Issue 21, we are also going to discuss, led by SC&A,

Shallow Dose, Issue Number 16, and Environmental Issue Number 20, also led by SC&A.

MR. FITZGERALD: Yes, that is already on there at the end.

CHAIR BEACH: On yours but the ones on line did not have those added.

MR. FITZGERALD: Oh, okay.

CHAIR BEACH: So that is for the folks on the phone.

And at this time, we are going to go ahead and start in with Bob Bistline, I believe you are leading.

MR. FITZGERALD: Well, let me give a little preface.

CHAIR BEACH: Okay, please do.

MR. FITZGERALD: This is Joe Fitzgerald and just a little history on this one.

You know, we look at the reliability of records, in terms of integrity, completeness and adequacy on all of the SEC

reviews as part of the Board's procedures. And of course, the reliability of records are fundamental to dose reconstruction and certainly key to the SEC review.

This one, we looked at adequacy and completeness. And they were really one white paper for a long time then we broke it up. So in essence, the first item, which is issue 11, which deals with adequacy is sort of the first part of the question of reliability of records. And the second part we have down as issues 12 and 13. So really this morning, we have reliability in two parts but they are really part of the overall same issue.

And as far as a little bit of background since we have been going back and forth on this issue for almost, well, a bit over a year in fact, the evaluation report claims that the available monitoring records, process descriptions and source-term data are sufficient to support dose reconstruction, sufficient accuracy, except for the '49 to '59

period, which was acknowledged as an SEC period.

We reviewed the ER and, in support of the Work Group, responded that we had a couple of issues with that statement, that conclusion. One was that the historic methods we felt were unclear, again, based on the evaluation report. And all of this goes back to the evaluation report and the site profile before that the historic methods were unclear in some cases. Not all cases, some cases.

Secondly, that the effectiveness of early bioassay methods, particularly the gross alpha technique, which we have discussed already in the past; we still had questions or felt that, based on what we have reviewed that it was still, in our mind, not clear how that is going to support dose reconstruction.

And with all of that in the white paper that we generated last year, we laid out again some examples, illustrative examples of what we were trying to convey on that.

The NIOSH response, and again, this has been going back and forth, the NIOSH response, I think, disagreed with that position -- overall position and provided certainly, I thought, some different perspectives on the specific examples that we offered. That, you know, they are in fact, where we had problems or questions or concerns, I think the response was they can be managed in some cases, if the issues were ones that were faced routinely in dose reconstruction, there's ways to, in fact, address these issues and work around them. In other cases, I think the NIOSH response was a request for more clarity from SC&A.

And I think on that basis the Work Group, last year assigned SC&A the task of going back and elaborating in more detail where this concern stemmed from and providing some more-detailed basis. And this is the genesis of the white papers. There are two white papers, one for Issue 11 and one for

Issues 12 and 13. So, the first dealing with data adequacy which we are addressing right now and the other dealing with the completeness issue.

And I am going to let Bob get into the findings on that first white paper, which deals with data adequacy, but that is kind of the background on that.

DR. BISTLINE: Okay, I just don't want to go ahead and address these issues and then after I address the main issues -- and they are pretty well covered in the executive summary of this paper on adequacy. Then, we can have some response from NIOSH and some interaction on some of these.

But the first point coming up is the fact that many -- there was a wide variety of radionuclides, including alpha-, beta-, and gamma-emitters. And the primary radionuclides of concern by building and room have been outlined in the King Report, Mound Site Radionuclides by Location.

And at times, Mound conducted operations where there were potentials for exposure to radionuclides outside the scope of Mound's bioassay capabilities and in some cases, bioassay techniques were available. However, the bioassay samples were not collected.

And examples for periods of time when Mound did not routinely analyze for other radionuclides -- and this the issue that we have tried to point out -- are demonstrated by gaps in the bioassay for radionuclides such as actinium, the americium-241, curium-244, protactinium-231, and uranium and thorium.

In response to these, the absence of radionuclide-specific data, the NIOSH proposes to use gross alpha and gross beta results. And since the radiochemistry was conducted on samples prior to gross alpha and beta counting, it is important to validate the ER's assumption that the chemical recovery is equivalent for all alpha emitters in the

generic gross alpha procedure. And we feel, SC&A feels, that it is important that NIOSH demonstrate the procedure for assigning internal dose to employees who were exposed to multiple alpha emitters during that time period when the gross alpha analysis was implemented at Mound because there were multiple alpha-emitters and it points out the fact that it is not clear how dose reconstruction for specific isotopes of alpha-emitters is going to take place.

In addition, it should be demonstrated how internal exposures will be reconstructed for gamma- and beta-emitters, in the absence of the gross alpha and beta.

So, this, the issue of gross alpha is an issue that we have some real heartburn over.

DR. NETON: Bob, excuse me, what time period is that for the gross alpha?

DR. BISTLINE: The gross alpha, these were during the earlier part of the

analysis.

DR. NETON: I mean, '59 to -- I mean is it a short period of time we are talking about or is it a long period?

MS. ROBERTSON-DeMERS: The gross alpha years were from 1956 to, I believe, through 1980, when they started doing alpha spectroscopy.

DR. NETON: And I guess that is helpful. Thank you.

DR. BISTLINE: So that goes outside the bounds of the SEC period, time period.

Another issue that is the issue on polonium, it is SC&A's judgment that the uncertainties of polonium, urine excretion results, were not adequately resolved. The accuracy of measurements depends on the efficiency of the plating method, which is in turn a function of the activity excreted. And the time after the intake, the mode of intake, and there is differences. The metabolism that is sited as a response goes back to the baboon

studies. And in conclusion, polonium calculated using results from urinary excretion and correction factors suggested the ORAU's Technical Basis Document 16 probably do not present the doses really incurred by their workers from polonium exposures until 1964, Millard 2004.

The uncertainties on the plutonium excretion results were not really resolved. The dependency of the efficiency of the plating and so on and the metabolism are not sufficiently accurate to estimate the workers' body burdens and to calculate organ doses, based on the baboon metabolism and the differences between the metabolism between the baboons and humans.

The next issue that is sited in this white paper is the issue of thorium which is a pretty large issue. And it gets into the method for thorium monitoring. The preferred method for thorium monitoring is really, because of the problems with bioassay urine

sampling, is usually using a combination of personal air sampling, PAS, and fecal analysis and monitoring, which were not routinely implemented at Mound.

And solubility studies from samples collected in the R building indicate that the thorium-228, thorium-232, and a fraction of thorium-230 compounds behaved as a class YY form, a very insoluble form, making detection in urine more difficult. So, this would put more emphasis on the issue of doing fecal and air sampling, in order to get decent results.

So, dependency on urine bioassay for thorium is really questionable because of the solubility issue for some of the forms that were used at Mound. And regardless of whether thorium or gross alpha bioassay is utilized for dose reconstruction, NIOSH has not evaluated the effectiveness of radiochemical techniques, thorium-specific or gross alpha, to isolate thorium in urine.

An evaluation of the radiochemistry

is necessary to verify the thorium. It could be effectively measured by the techniques employed.

And the ER evaluation report does not clearly state how NIOSH determined the employees with the greatest potential for exposure were monitored. In other words, how are these workers that may have had potential exposure to thorium, including support workers, identified. And so we have some concern as far as identification of workers because NIOSH says that employees with greatest potential for internal uptake were monitored but the question is, how that is being determined and how support workers fit into that equation.

Similar to the difficulties in interpretation of radium-226, and actinium-227 and thorium-228, there are similar issues associated with the data interpretation of thorium data prior to the implementation of the thorium procedures. And MJW does not

indicate in the pre-1989 reports that the data-interpretation issues diminished after February of 1959, the end of the SEC. In fact, the following comments were made related to that. And there are four different specific comments that are brought out in the paper here.

In many cases, there were results for an element such as radium or thorium but it was unclear which isotope was intended. And there was no information on the age, solubility or chemical form of the element. And certainly one of the most fundamental problems faced by the assessors assigned to the other radionuclides was to determine if there was even sufficient data upon which to estimate whether the individual would require a Phase II assessment. And in some cases, the sample is identified by a code number. No person is directly associated with it in the log book. And a second log book must be consulted for the cross-reference between the

person and code number.

We found that there is data that is located in various locations, and this will come up in the completeness report later, where one has to go to a number of different locations and databases in order to be able to trace this down and we are not sure that that is being done by the dose reconstruction of individuals, that they are capturing all of the data that is out there. And regardless of the availability of a thorium bioassay procedure, bioassay-specific for thorium at Mound is limited.

A total of 84 sample results were located by SC&A for thorium-232 for the period 1960 to 1967 from the database of the excretion data of other radionuclides and the database of radium, actinium, thorium excretion data as well as log books and bioassay reports. There were no sample results during this time period for thorium-230. In addition, five samples were located

for the 1970s and NIOSH should produce the thorium samples for the periods 1960 through '67, 1972, 1978, and 1979. In contrast, there were 238 thorium-232 bioassay results and 180 thorium-230 bioassay results available for the SEC period, based on the MJW, other radionuclide files.

So in summary, the limited amount of data and the shortcomings associated with data interpretation remain for thorium beyond the established SEC period ending in February of 1959.

Although urinalysis data exists for thorium prior to 1970 procedures on how these samples were analyzed and interpreted are not available. The data infers that at least a portion of the thorium analysis was analyzed by the radium extraction and differential accounting method to measure the radium daughters of the thorium. And if this is the case, then it is noted by MJW. There are a lot of questionable assumptions to be made in

using an excreted daughter to estimate the intake of the parent.

Use of radium daughter analysis for thorium isotopes is suspect due to the questionable assumption that the daughters are in equilibrium with their parents. And the lack of bioassay procedure information can make the derivation of the minimum detectable activity or minimum detectable concentrations which form the basis of the NIOSH-proposed method of assigning missed dose difficult, at least.

SC&A recommends that the procedures implemented for thorium analysis be investigated further. NIOSH should demonstrate the feasibility of conducting thorium dose reconstruction prior to 1970, the earliest date when a specific procedure can be located for thorium analysis. Furthermore, NIOSH should demonstrate the supplemental data such as process information and air sampling data are available for all years and areas

where thorium was handled.

So, that kind of summarizes the issues with regard to thorium. As far as some other radionuclides, as a result of the inability to isolate radionuclides such as Pa-231, actinium-227, and thorium-228 directly with early bioassay methods, radionuclide progeny, or daughters, were used as a surrogate for the parent. And where daughters are used to derive parent radionuclide activities, knowledge of the ratio of the daughters to parents in source terms must be known and the differential effects of biokinetics between the parent and the daughter radionuclides must be considered.

Because of the difference in solubilities and the metabolic differences in biokinetics, data can be obtained from process information. However, the age of the material is generally unknown in equilibrium between parent and daughter. It depends on the age of the material, and equilibrium may or may not

exist, which complicates trying to use a surrogate or a progeny as a means of calculating dose for those individuals.

Given the uncertainties of the early bioassay techniques for these isotopes, the limited amount of bioassay data available are for these radionuclides. The feasibility of performing dose reconstruction prior to development of such methods for parent radionuclide isolation is questionable, in our minds.

There is also an issue of, a question of the chronic or multiple intakes of the radionuclides that may confound the problems associated with determination of retention and excretion rates. And these issues introduce large uncertainties in the determination of intakes of the Pa-231 and actinium and thorium-228.

Going on to the next issue that is brought up in the paper is the issue of tritium and the question of tritium at Mound

did not exclusively handle tritiated water and gas but was involved in research and development activities for other tritium compounds. And it is a very well-known that there were a large number of tritium compounds handled at Mound. We have been able to trace down at least, well, I have got one table of 35 different compounds and the number actually, it turns out, is probably more like about 50 compounds of tritium. Many of these are stable metal tritides and the ER did not provide a discussion on how tritide exposures will be identified and assessed, although this issue is partially addressed in the OTIB-0066 calculation of dose for special tritide compounds that ORAU published in 2007, for which SC&A provided a detailed review in 2008.

Pre-1982 data is available only in terms of dose in the MESH database and the individual exposure files.

In the absence of these data, the -- oh, excuse me, I mentioned that. How is

NIOSH going to apply OTIB-0066 model and how can they identify the workers exposed and to which of the many different compounds that were present? These are questions which we have in mind and there is a session later on talking about the tritides where we will get into a little more discussion of this.

Another issue that is brought out is the bioassay collection and timely analysis, the failure to collect and analyze bioassay samples in a timely basis leads to questions about the validity of the sample results. There has been questionable implementation and coverage of the bioassay program at Mound and detailed characterization of areas and appropriate guidance assessing bioassay requirements are not effectively implemented until the site transition to D&D mission. So, this was not until much later in the years at Mound.

The absence of inadequate or infrequent participation in the bioassay

program can lead to an internal exposure which may not be bounded by assigning a chronic exposure based on the reporting level or bioassay samples were not collected within several effective half-lives of fast-clearing radionuclides. Because of the sampling that was done, there were times when, probably, the time between the samples actually ran for short-lived isotopes through several half-lives. It would have been through several physical half-lives of those radioisotopes. And so there are some issues that we have with trying to do the dose calculation based on the fact of sampling frequency.

Although NIOSH has developed a co-worker model for plutonium and polonium, the issue with absence of or inadequate monitoring extend primarily to other radionuclides. NIOSH should demonstrate the existing dose reconstruction models and bound situations outlined in the Price-Anderson reports, keeping in mind that the details of potential

exposure will not be readily available prior to consistent implementation of the radiation worker permitting process which didn't come in until 1989.

So, this kind of summarizes the issues that SC&A is concerned with in terms of the adequacy of data.

Joe, do you have --

MR. FITZGERALD: No, the only thing I would say is that you know, the white paper, I think has been in NIOSH's hands for probably three or four weeks. So, it is not a long time for the details that were provided. But I think that is a pretty good outline of what we had originally raised last year in a little more detail, more examples and faces.

CHAIR BEACH: NIOSH, would you like to weigh in?

DR. ULSH: Oh, yes. Well, as Joe mentioned, the latest SC&A paper has been in our hands for about three weeks or so and we will be preparing a detailed response to it.

Obviously, that couldn't be done for this meeting.

But there are a number of issues that Bob raised and I am not sure that we can go into a detailed discussion of all of them. But I know that there are a number of people on the ORAU team who want to jump in here and address some of the specific issues, including Don Stewart, Liz Brackett on the phone, and perhaps Mutty Sharfi, who is also in the room here.

Just for a few of them, in General the quotes that you cited from MJW, I think Liz, would you like to talk about those?

MS. BRACKETT: I guess there so many issues. Can we pick one?

(Laughter.)

MS. BRACKETT: Because I wasn't taking notes because I thought maybe we would go through and address one at a time. And so I am kind of overwhelmed.

DR. ULSH: Okay. Well how about,

let's talk about the radium/actinium/thorium method and the difficulties that MJW quoted or the quotes that Bob gave from MJW on that.

We agreed that there were issues with the radium/actinium/thorium method and that was the basis for the SEC period up to 1959. We understand that, and that is already a given. It was surprising to me that you talked about a difficulty with actinium in years after that. We have also talked about that issue in the past.

Oh, and the other quote that you gave was that MJW did not say that that problem interpreting those results diminished after 1959. Well that is correct; we never said that they did. The issue with the radium/actinium/thorium program was that it was completed and D&Ded in 1959. So it is not that all of a sudden we can interpret the bioassay results, but rather the program to which those results related was finished and done.

Now, we have talked about in the past that there was a small operation to extract some of the actinium that was done inside a hot cell. We talked about that. There was a spill inside the hot cell but it was completely contained. So it is not that we suddenly became confident in the bioassay method but rather that program was done and over. And it is not like actinium processing continued after that date. Certainly, they had an issue with actinium samples early in the D&D period but that was related to D&D of the facility. And I think we all know what we are talking about here, our corridor job. But it is not like they were doing actinium samples throughout Mound's history. We talked about that.

With regard to the thorium program, I think a little perspective is in order here. Mound did have a large inventory of thorium material. It came onsite in I think late 1954 and in early 1955. This was residues,

Brazilian monazite residues, oxidite residues, a bunch of different kinds of thorium residues. And Mound got this material in anticipation of operating a thorium refinery.

That program never got off the ground. They received the feed material. They even built the facility to handle it, the pilot plant to handle it, but that project was canceled in 1945 and never went into production.

So, since that happened, Mound was left with all of this inventory of thorium material. The only thing that we are aware of that Mound did with that material was re-drum it because it was contained in drums that corroded. The material in some cases was stored outside and drums were in very bad shape, so they re-drummed it. This involved only a handful of people, approximately 20. Don't hold me to that number but we know who they are. We have bioassay results for them.

Now, I know that some questions

have been raised about the adequacy of the thorium bioassay but I think we are missing one of the important pieces of information that that bioassay, that collection of bioassay results gives us and that is, who was involved. We have done worker interviews. They confirm the small number of people involved. They also confirm the sporadic nature of this work. It was done primarily in the months of the year when the weather was good: the summer. And some of the drums, it was re-drummed up to about three times.

This work was performed, by and large, outside. Respiratory protection was employed. So, we can talk about the thorium bioassay methods and results. But the bottom line is this involved a small number of people. Due to the issues, the continuing issues of having to re-drum this material, they eventually built Building 21, which was located near the site periphery, far removed from other buildings onsite, other facilities

onsite and the material was emptied into this building.

Now, keep in mind that this building is essentially kind of like a silo and it was unoccupied. People didn't go into this building on a routine basis, although sometimes they did to sample, to do air sample. So, it is not like this material was a source of exposure to other people onsite routinely.

So I just think we have to keep a little perspective when we are talking about thorium-232 and I know that there are some other issues that we will need to go into in our written response.

The same kind of perspective needs to be drawn with the protactinium-231 program. Yes, they did have several, numerous drums of material to extract plutonium, I'm sorry, protactinium-231 but that program involved about five people. So it is not like it is everyone on site. And there are protactinium

bioassay results but it wasn't as if that protactinium was in isolation. At the beginning, it was in residues in very, very low concentrations. So, yes, we did use surrogate or Mound did use surrogate radionuclides.

Now, you mentioned that you have to know the age and material and several other factors of biokinetics. But the bottom line is if you are working with a drum of material that contains numerous radionuclides and you sample for the most prevalent radionuclide and you don't get a positive result, that indicates to you that an uptake didn't happen. So that is, I think, the approach that Mound took.

And it is kind of difficult to see how they would have selectively got exposed to the trace element without being exposed to the major radionuclide in the matrix.

Now, you mentioned chronic versus acute and some uncertainties that that brings

in. This is a -- do you want to jump in now?

MR. STEWART: This is something that we evaluate on a case-by-case basis. We look at bioassay data and try to determine whether what we have got is chronic or acute. When we don't know, which is often, we will simply assume the one that generates the highest dose. And that is the approach that we take to every single case. Very rarely will we say, aha, I have a result here. It is an acute intake.

And if you have enough data, you can isolate that. You can go back and say well, chronic intake results in a very large dose, which I can't use that much dose. It is too claimant-favorable but I have enough data to isolate this. I have got incident data. I have got repeat bioassays, follow-up bioassays, whatever I do, whatever I have got to generate an accurate dose.

But as I say, it is very seldom that we do that because as we all know here,

the vast majority of claims fall into the easily compensable or the easily non-compensable range. I don't have to generate an accurate dose estimate. I just have to be right. Is it greater than 50 percent or less than 50 percent.

So, if I have a guy that has got tons of plutonium intakes and lung cancer, I will assume a single acute intake on this one day, I will come up near the data point on the graph and drop down below it. I will have a number of data points above the line that I draw, the excretion curve. But that dose is sufficient, in and of itself to determine whether that case is compensable. So, I am done. I don't need to generate an accurate dose. I have established that it's obvious this guy's dose is going to result in compensability.

On the other side of it, I may have a number of data points that I could plot very accurately. But if everything I do is not

going to make this case compensable, I will simply pick the highest one, generate a line that sails over every data point, generates a very large dose, and yet is not compensable. So that again, is not an accurate dose estimate but it is sufficient to show whether it is compensable or not.

DR. ULSH: Well, this is not a Mound-specific issue. We use this strategy in every dose reconstruction we do.

MR. STEWART: Correct.

DR. ULSH: So, I don't know why this is being brought up as an SEC issue for Mound when this is an accepted methodology.

MR. FITZGERALD: Well, let me step back. Again, the ER, I think, didn't focus on the reliability or assay question other than making a statement that there was sufficient data, there was sufficient process information and, you know, made those statements. And certainly, the Work Group, if not the Board obviously has the responsibility of probing

the reliability. So what we are saying is that we, in the process of looking at this question of reliability, posed the questions of, you know, and this is particularly on the other nuclides, and clearly we looked at the mainstream and felt that you know, during the history of the operations, the mainstream nuclides, plutonium, what have you, did have in fact an established bioassay method and we found the documentation, we felt that it was certainly evidence of accuracy.

On the other nuclides, and granted, I think your point was, five workers here, ten workers here, these were relatively small operations. These were secondary operations made at the plant. We were less clear because ER didn't treat those subjects. Less clear what the strategy of dose reconstruction would be.

And again, this is the going through and looking at the balance of the plant in terms of the nuclides saying, it is

not treated specifically in the ER. We do have questions. We are concerned, in some cases, because it is not obvious to us what the reliability of the dosimetry is for each of these. And we posed these in a very short form, I think, last year, and tried to be a little more elaborate this time.

So, you know, this to me is just simply clarifying since the ER did not address these specifically but made a broader statement what the stance is, how dose reconstruction would be done. In some cases, I think you are saying that it would be addressed in the dose reconstruction procedures. In other cases, you have, I think you stated this before, Brant, that there is mitigating issues relative to the number of workers involved, as well as some of the techniques applied. That is what we want to clarify. We have to walk through this but I think these are the questions that came up. So that is the context of why these were

raised. You know, I don't think we are presuming that we found this huge gap that we are saying that the ER didn't go into these other specific other nuclides in the detail that would give us confidence that the reliability has been addressed. And that, I think is the responsibility of the Board to ask those questions.

DR. ULSH: Okay, I understand --

DR. MAURO: John Mauro. I would like to add a comment. You know, I have reviewed these six white papers and I understand the response you provided, the fundamental concept of your strategy for bounding dose reconstructions. It is not intended, necessarily, to be an accurate but to make sure a good decision could be made regarding compensation.

But you know, when I reviewed these issues, the ones that were just summarized by Bob Bistline, it seems that there seems to be certain radionuclides that you are going to

have a difficult time placing a plausible upper bound on, for the reasons described. And it is not apparent to me that you do have a good method for placing a plausible upper bound, in light of the limitations that were identified by Bob.

Maybe we could talk a little bit about, as was mentioned earlier, we went over so much material, starting with the gross alpha work and then proceeding on through all these other isotopes. And unfortunately, I think we gave an overview of really all these internal dosimetry issues. And it would be a pretty good idea, I think, let's go; we have got two days and if you agree, let's go to the issues one-by-one, perhaps starting with the gross alpha analysis and how, with the gross alpha analysis and the uncertainties regarding the biokinetics, chemical form, and recovery of radiochemistry. When you do the bioassay for urine, how are you going to place a plausible upper bound when you don't know

which radionuclide chemical form and perhaps the, I guess, recovery efficiency is. You know, I would like to hear a little bit about -- that would be one example of one particular issue that if there is a way to place a plausible upper bound, given these circumstances, I would like to hear conceptually a little bit about how you are looking at it or would you rather wait until you have a chance to prepare your formal write-up?

CHAIR BEACH: John, this is Josie. And while we do have two days, we do have a very full schedule. So we are going to give them an opportunity to respond to your question but I believe Kathy wanted to add something before we do that.

MS. ROBERTSON-DeMERS: Let me ask you a more basic question. You have got somebody who is exposed to multiple radionuclides at Mound. Can you walk me through what records you would get to do the

dose reconstruction and how you do it?

MR. STEWART: It is always difficult to do that in the abstract. What records do we look at? Right now, the technical basis document doesn't drive us to drill down to this level of detail, and that needs to be revised. So, right now, we don't have that process.

We will see records for Pu-238. And we typically accept them at face value at this point. Some of the older records will be listed as thorium, radium, actinium, in some cases, protactinium. We do have some procerium, some proamericium. But we will have those -- when those are present in the record, they are evaluated.

MS. ROBERTSON-DeMERS: Let me clarify here.

MR. STEWART: Could you speak up just a little bit, Kathy? I am sort of hard of hearing.

MS. ROBERTSON-DeMERS: Are you

looking at just the individual employee folder for data or are you going out to the MESH database and collecting that data? Are you going to the MJW tables and collecting that data?

MR. STEWART: The very simple answer is we look at the employee data files because that is what we are given. That is the standard approach as far as dose reconstruction.

DR. ULSH: I would assume they give you a MESH.

MR. STEWART: Yes, MESH is part of that record, Kathy.

MS. ROBERTSON-DeMERS: You mean the printouts?

MR. STEWART: Say again, please?

MS. ROBERTSON-DeMERS: You mean there are printouts of the MESH data in the files.

MR. STEWART: That is correct.

MS. ROBERTSON-DeMERS: Okay and

then you find, for example, that somebody has been working at Mound from 1959 to 1994, for example, and they have been exposed to, potentially exposed to uranium, thorium, radium, actinium, fission products, plutonium. How do you go about assigning the --

MR. STEWART: Well the simple answer is, we don't find that. Other radionuclides are a problem at other sites as well. And what you have got is very small programs worked on by very few people. Most of the people walking around at Mound were exposed to polonium or Pu-238. And that is what is in their records.

DR. ULSH: But in terms of gross alpha, if we have knowledge that they might have been exposed to some of these other alpha-emitting radionuclides, those would be in the mix for dose reconstruction in terms of -- I mean, if there is a potential for them to be exposed to say, uranium, then we would consider that.

But by and large, like Don said, these programs were extremely small. So, if you have a gross alpha result and followed by lots of plutonium-238 results, chances are, it is plutonium-238, if there is anything in the gross alpha.

MR. STEWART: Right. The dose re-constructor doesn't go into a dose reconstruction with a preconceived idea of the radionuclides he is going to or he is going to assign. They look at the data in the case. They look at what the claimant may have said about what the person was exposed to and then they go from there.

So, I mean, you could find that and I have found that in the past. I had a gentlemen who had a lot of polonium bioassay, routine polonium bioassay and in fact, his work was on polonium research. But he also had a couple of other samples thrown in there. So, those were evaluated as well.

You typically don't get that. You

know, you have to remember that the cases we are looking at are a small fraction of Mound employees. And I don't know what the numbers are. Several hundred Mound claims. There must have been tens of thousands of Mound workers by this point.

So all the dose reconstructor is going to evaluate is the data for that specific case.

DR. ULSH: Well and another thing to consider is that not in every case, certainly, and not for every particular organ in the body but in most cases, plutonium-238 is going to be the claimant-favorable choice.

MS. ROBERTSON-DeMERS: Well, I guess that is what I am asking. If you have got multiple, if you have found that somebody has potentially been exposed to multiple alpha-emitters for example, how are you going to assign?

DR. ULSH: We are going to take the most claimant-favorable choice, just like we

do everywhere else.

MS. ROBERTSON-DeMERS: And you are going to take the most claimant-favorable radionuclide recording.

DR. ULSH: Of course. That is what we do everywhere.

MS. ROBERTSON-DeMERS: And assume that say a plutonium-238 value that is given is actually thorium, for example, if that is the most conservative.

DR. ULSH: If it is reasonable to assume, keep in mind, say for instance the thorium, the example that you used, we knew who was involved in the thorium program. We have thorium bioassay results. Now, you may not like what the thorium bioassay results tell you but it does tell you who was involved with the thorium program. So if we, let's say, we have someone, one of these, let's just pick a number, 20 people who are involved in the thorium program and their claim comes in for dose reconstruction and they have a gross

alpha result, of course we are going to consider thorium as one of those possibilities. And if it is the most claimant-favorable choice, say it is a bone cancer, of course, that would be in the mix. That would be one that we could consider.

MEMBER SCHOFIELD: Okay, what if we had someone that comes in from one of the crafts who is not part of the polonium project, he is not one of those 20, but he or she comes in there to do a particular job and gets exposed or even multiple times because they have the certain expertise or they are familiar with that system there. So, they come into that area but yet you are not going to show them in that database that they were one of the polonium workers. How are you going to address those type of people?

DR. ULSH: Wait a minute. Are we talking about --

MEMBER SCHOFIELD: Okay, we are talking about, it doesn't matter, take any of

the -- whatever you want to pick. It doesn't matter. We are saying that you said there was like 20 people in that project, --

DR. ULSH: Thorium.

MEMBER SCHOFIELD: -- thorium project. Okay.

Now, you have got these craft workers, maybe fire department, maybe guards, come in there for whatever reason, doing something and getting an exposure. But when you go back and look at that database, it is not going to show that they worked with thorium. And they may not even actually have any bioassay for thorium because people making decisions said, well, they don't really work in that area. But for whatever reason, they had to go in there and do a job or they were in there when something for whatever reason.

MR. STEWART: As far as the thorium re-drumming goes, those were craft people.

DR. ULSH: Yes, exactly.

MR. STEWART: They were riggers,

laborers. They were assay by job. You know, they were doing this thorium job so they are bioassay. And I think you will find that that is generally true with Mound.

MEMBER CLAWSON: Well, yes, but the point that he is trying to bring up, you guys have brought up a very good point that certain people only worked on actinium or any of these low radionuclides. You are saying 10, 15, maybe five or whatever. But you have got support personnel that come in there continuously to be able to redo calibration on instrumentation, do maintenance on their work, do ventilation upgrades or anything else like that. Those people aren't going to be monitored. Because as most of the sites, and we have all seen this, have said no, they are not into this 24 hours a day. They are just bits and pieces so they don't need to be monitored for that because that is costly. So just monitor these and we can go from there.

Because you have people going

through this stuff all the time. You have all your support organizations, endless ones, that are going to be going in there but they are not monitored.

MR. STEWART: Are you talking about this from a Mound-specific point of view or on a complex-wide basis?

MEMBER CLAWSON: It would be a complex-wide issue. You get into this quite often. But Mound is the exact same thing as the rest of these. We have seen at so many of these sites that the decision has been made, these ten people are the scientists that are going to work with this, so we will monitor them for this.

But then you have all your instrumentation people coming in, all your maintenance people, your electricians, changing out pumps. You have the broad spectrum of people going in there that are not monitored for that.

DR. ULSH: But you have to consider

the individual situation here. For instance, with the thorium program, as Don said, these were the crafts people that were monitored. I mean, that was pretty much a -- it wasn't a research program it was --

MR. STEWART: Crafts.

DR. ULSH: Right. The uranium activities, again, a small number of people. But to even get into the radiation controlled area, you had to be on a bioassay program. And by and large, the primary radionuclides of interest, like Don said, polonium in the early years and then it transitioned to plutonium-238. If you went into those areas, you were on a bioassay program.

Now, I just thought of a caveat to that that in the later years, in the D&D years, of course, you have a DOE regulation where only if you had the potential for 100 millirem per year. So there is a slight caveat there.

But by and large, I mean, Mound was

a very access controlled site.

MR. CHEW: Let me just jump in. After a few months away, I am just getting back into it.

Let's talk operational. And I think you know because you are in operation. I was an operation RHP. Let me tell you what is really going on.

At Mound, especially with the radioisotopes that we are talking about, plutonium isotopes and polonium isotopes they are handling glove boxes. There are many indicators. There are many indicators that tell you that an exposure potential could have occurred. Glove breakage, leakage, something you did wrong, bag out, okay you name it. So there is swipes and there is air samples.

Now, the people who are actually working on a day-to-day basis, less conservative on a routine basis. But if a relevant person came in and did something that potentially caused an exposure, indicators

would show up very quickly -- air sample, swipe. In these particular cases, what we did was, and you probably did, too, this is an incident because these are the people who are not normally working with the material who potentially get exposure. We have got to talk about exposure potential.

And so you could always give a hypothetical situation when a person walks in they walk into an exposure. And I would say from an operational standpoint, those people are, for lack of a better word, are generally picked up. When you see that, yes, there was a bunch of craft people that came in and they opened the pump and they did something wrong. No operational people were around. That is not usually true. We usually don't do a job unless there are monitors around plus all the other indicators.

And so my comment to you is that if the people are crafts people coming and did something that is unusual, that is huge

created and not only for exposure potential but a real exposure for so many indicators that they would have followed up on bioassay. And as you know, one of the things that you have asked us to do is go back to the road map and pull all the incidents.

So I am saying, you have got to think operational. I think you understand --

MEMBER CLAWSON: I understand that. And being in operations, took, you understand that we have in the earlier years, you had so many wonderful HPs or RAD techs or whatever watching us. They would come in, they would swipe the outside of it and say okay when you guys break this, I want to be able to take a look at it or whatever else. We are pulling out whole pumps or breaking lines or whatever else like that. A lot of times, there is not enough coverage to go around.

But the whole thing is, when they make the term you are on a bioassay program, you know, we will catch it if anything does

pop up. But a lot of times, they were looking for these other odd ones that came out. Where were they? When they went into the -- they checked for everything. Did they give the bioassay the whole gamut or --

DR. ULSH: Well, I think the thorium example, it is kind of unfortunate in the way that we have focused on that one because it is not typical of what was going on at Mound because it did involve a lot of primarily crafts people. It wasn't an active research program, it was just re-drumming.

But some of these other exotics, I would call them, or the other radionuclides, they were very small in scale. They were very limited, a limited research program. And you didn't have craftspeople wandering through.

MEMBER CLAWSON: But you had them maintaining. That is what I am saying, these programs did, these guys didn't walk into a room and you never saw this stuff again until five years down the road. There was

maintenance that had to go on there. There had to be instrumentation that was calibrated. There had to be all of this to be able to make this research work. This is what I am talking about because we see this so often so many times.

We have instrument techs that go in there that pop lines on things. They are supposed to be so clean, no big problem. They are not.

But then I realize what you are saying Mel, but you know as well as I do that what I am trying to say is that when we put a caveat on there that this is a very small operation and only five people worked on it, times that by about five. Because that is usually what ended up working onto it.

Because when there was also incidences, it brought in more people of hey, you know, what do we need to do to just be able to monitor this, to be able to keep this better off. This is the point that I am

trying to make.

MR. CHEW: Let's go back to your reference point where I know that you worked in the chem plant. And I think we can go back and look at how the chem plant was designed. Remember, it was a pilot plant that operated for infinite years here and it should have been shut down initially. I think that was the first pilot plant that really was a pilot plant.

And I think if I remember correctly, part of the problem was the chem plant was the instrumentation information was brought back lines from the process actually came into the control room. That is why you actually had release.

I had many tours of the chem plant and I wonder why they flunked. That is not true of Mound. Mound is dealing with high specific activity, alpha emitters, plutonium, polonium, those were the big ones, and we were handling glove boxes. It didn't have

instrumentation lines that were outside of the glove box, the material solution, fission products like you do. The chem plant actually has an excess.

So, it is a different type of operation. And like I say, go back to it. There is just so many other indicators that tell you that their exposure really did happen. Okay, exposure potential is obviously when a person comes in and does a job, they assess the exposure potential. The exposure that really did happen is you follow them not only for contamination there, you know you can go back check their hands and feet, show the air sampler. The air samples are collected. You collect an air sample and say gee that day, there was a high air count because you see it a few days later. Who was in there? Well, gee, there was a craftsperson in there. Let's go do a bioassay. And this happened.

MEMBER CLAWSON: And I realize that and I cannot speak for Mound on the air

samples. But you know what? We never really started pulling a lot of really good air samples into the late '80s and so forth. There weren't a lot of them pulled.

And I am just speaking from my side. I can't talk about Mound because I wasn't there but it seemed like we got a universal throughout all these telling like 1985, '88 somewhere in there. That is when our radcon program really stepped up. We have got to look at that it really was in those days.

MR. CHEW: Yes, I don't know who is supposed to be speaking about the roadmap later on. Okay? I think it is the next day but I think I also brought a couple of things to show about the roadmap. I think the roadmap was good. As a matter of fact, I think was saying, no you gave them too much detail. I said okay, that is fine.

MEMBER CLAWSON: You can never have too much detail.

MR. CHEW: Right. But I think if you really clearly look at the roadmaps, they are identified by room, by building, by period of time. The process was very important. Okay, we put a lot of process information. Sensitivity of the roadmap, obviously, and anytime that we know what radionuclides were present, they are listed, and then also the bioassay methodology.

So I think we need to think about that. You know, we presented you the potential exposure potential but to know understand what really exposures did occur and what follow-on. And then now when you have information on that real exposure, what does the dose reconstruction do with it?

And I think you know Brant and Don is just basically talking about that we took the most conservative radionuclides and used that as the basis.

MR. FITZGERALD: Well, I think we have -- just to reaffirm what Brad commented

on just a little earlier ago. You know, we have looked at the multi-purpose laboratories. Now Mound certainly doesn't resemble Los Alamos or Livermore, but still, --

MR. CHEW: Or a chem plant.

MR. FITZGERALD: -- or a chem plant, but in the pre-1980 era and examining laboratories like it, I mean, these issues are not new issues. You know, the notion of whether or not the technical feasibility was there to accurately measure mixed fission products, mixed fission activation products, a very big issue at some of the other laboratories. The same thing with thorium at Y-12.

You know, there just, to me, is a time frame where these, you know, the technology was on cusp and we did have exposures taking place. The question was whether in fact you had the bioassays being done and whether or not they were being done after these.

I think we are talking about an early period where Mounds, like some of the other laboratories, were in fact on this cutting edge in terms of technology. The technology at Mound wasn't any better or worse, perhaps, than other laboratories. In fact, a lot worse based on Oak Ridge, in terms of the techniques. But nonetheless, I think the issues are very similar and we have asked the same questions and have had some concerns at other sites.

MR. CHEW: It sounds very similar to Rocky Flats. Bob, I think you and I met, I met you the first time when I was sent to Livermore to visit Bob Bistline, to find out what he does.

DR. NETON: I think we have been focusing a little too much on the bioassay program because that is a fact of the final safety measure and an entire radiological control program.

You know, we are talking almost

like we use people as human air samplers to see if the program is really working properly. In fact, that is the last stop at that measure. We either look at the radiological control program, the controls Mel talks about such as glove boxes, are there continuous air monitors in place. You know, there is some sort of a general area air sampling program to supplement that, along with swipes.

And so you know, you have all those control measures available to you. And I haven't look at the Mound data but I assume there is data available to -- at least the program would be in place to document that. And the fact that a worker may have gone into an area and does not have a bioassay does not mean that it wasn't, his potential for exposure wasn't assessed at some point, using either air samplers, swipes, that sort of thing.

So you can't just assume because people weren't bioassay monitored that there

was this large unmonitored exposure going on. You have got to look at the whole picture.

MR. CHEW: And also not assume that just because we list the radionuclide in that particular room, --

DR. NETON: Well, right, I mean --

MR. CHEW: -- doesn't mean it all jumped into the person's lung. It just doesn't happen.

DR. NETON: I mean, so you have to look at in perspective.

MS. ROBERTSON-DeMERS: And I think -- this is Kathy DeMers. I think you need to be aware of something that, you know, -- I think you need to be aware that there were some facilities at Mound that were used that, where they did use glove boxes but they were not designed for that function. And so they had numerous problems with incidents.

MR. KATZ: Excuse me. Excuse me, on the line, please. On the line there is a discussion going on and it is interfering with

the discussion in the room. Could you please mute your phones? If you don't have a mute button, just use *6. That will work. Thanks a lot. And then when you want to come off mute, you just hit *6 again. Thanks.

MR. STEWART: I'm sorry, Kathy, could you go through that last bit again, please?

MS. ROBERTSON-DeMERS: Okay, there was a facility at Mound where they did handle things in glove boxes. But it was not designed for the handling that they were doing. So they were having numerous problems, incidents. This was SM building.

MR. STEWART: Say again.

MS. ROBERTSON-DeMERS: SM Building. And so also keep that in mind. And we need to make --

MR. STEWART: Is that covered in your paper?

DR. ULSH: I'll take that one, Don. Yes. We are certainly aware of that, Kathy.

One of the problems with SM building, and we have been talking to former workers and they all, to a man, emphasize that it was just a nasty place to work. The problem with SM building is that they handled plutonium-238 but it was designed, essentially, to handle plutonium-239. And they didn't take into account the high specific activity of plutonium-238, the amount of heat that is generated, and they led exactly to the kind of problems that you just described; numerous leaks, numerous incidents. That is absolutely true.

That is why eventually they built PP Building to replace or to take over the activities of the SM Building.

Certainly while it was in place, though, there were numerous incidents like you described. Numerous incidents with plutonium-238, primarily. I mean, I can't say that is the only thing that ever went into that building but far and away, that was the

mission of that building with plutonium-238 handling.

And people who worked in SM Building would have been on plutonium 238 bioassay.

MR. STEWART: And we see that in the records as well. You know, there is a noticeable drop in positives when you get out of the SM Building.

MS. ROBERTSON-DeMERS: That is not the only thing that was handled in SM building.

MR. STEWART: No, it certainly wasn't.

MEMBER SCHOFIELD: Let me give you some hands-on experience there. With 238, it is a real nasty player to clean up. It is very difficult. It is kind of like chasing mercury all over the place. I mean, that is effectively invisible mercury that you are playing with.

Well you go in. You have had an

exposure, whether it is broken line, a broken window, a torn glove. It doesn't matter the cause. Time is money. And you go in there and you try and get it cleaned up as quick as possible.

Now how often, and I could give you hundreds of examples where these guys go in there. Later on somebody goes in there. They get up underneath the glove box where there is some penetration and they get up on top where there is motors and electrical trays.

Well, they have got the front of the glove box down on the floor, all the very nice exposed stuff cleaned. But there is still loose contamination that can sit there for years. And they send this person in there and say well, you know, we just want you to insulate those lines for us, you know, we are having a little problem.

Fine, they go up there. They says we need new cable strung. You know, just use the existing tray. They get up there and they

get exposed. Nobody is expecting exposure up there. Nobody is going to do a bioassay. Maybe they just had one done because they are only on an annual bioassay. So, it is almost twelve months down the road before anybody knows they got exposed. And this is hands-on stuff I have seen time after time.

And I don't care what SOPs read. The bottom line is these people get exposed. A lot of times, it is not caught until quite a bit down the road, if it is ever caught. A lot of times, it is not even discovered until they start demolishing or cleaning up that building. My God, these electrical trays or where the bolts are holding the trays to the roof or the walls, there is loose contamination behind there. Well, you didn't really care about it. Your job was to get it cleaned up, get back in business again.

But a lot of these people, we have had it, and it is well documented that we have numerous instances in Los Alamos, I can't

talk about Mound, where people have gone in there years later. And they go, hey, those guys were in there last week? Yes. Well, guess what? We don't know how many people have been exposed because when these guys starting monitoring themselves, they were all craft up. This is real world stuff. This is not theoretical. This does happen where these people get into these situations. What?

MR. STEWART: I have covered some of those jobs.

MEMBER SCHOFIELD: Yes.

DR. ULSH: So let me talk about the real world situation at Mound as related to me by people, the health business systems in charge of the building who was actually in the stuff by other former workers who actually worked in SM building.

Did exposures happen? Absolutely. Did contamination incidents happen in SM? Absolutely. Did contamination incidents

happen where perhaps you might not have expected? Yes, for sure. Did people sometimes get sent into areas where they weren't expected to be contaminated but they got contaminated? Yes, absolutely. And those people were on bioassay programs. So the question is not did people get exposed. We all agree that they, in some instances, some people got exposed. The question is, can we do dose reconstruction on them? And the answer is yes.

Now maybe the bioassay wasn't done the following week. Maybe it wasn't done the following month but it was done. If you went into SM Building, you were on plutonium-238 bioassay. And we have methods to estimate. I mean, let's say a person goes through and they have negative bioassays, six months later, they come up with a positive bioassay. We can do a dose reconstruction in that situation. Even if they got exposed the day after their last negative bioassay. We just don't have

situations where people got exposures to plutonium-238 and we can't do a dose reconstruction at Mound. We don't have it.

MR. STEWART: That situation doesn't arise.

MS. ROBERTSON-DeMERS: Can I ask a question? I am jumping ahead.

MR. STEWART: Can you speak up, please?

MS. ROBERTSON-DeMERS: I am jumping ahead here but what is the status of the roadmap? Is there a classified version?

CHAIR BEACH: Can we hold that, Kathy, for another -- In keeping with our schedule, which I am going to try really hard to do, this is Josie, what I would like to do is get last minute inputs.

I would like to request that NIOSH respond to SC&A's white paper in detail, answering the many questions. For example, on page 25 of the white paper, one of the questions requests that NIOSH demonstrate the

procedure for assigning internal dose to individuals who were exposed to multiple alpha-emitters during the time period when gross alpha analysis was implemented at Mound. That is one question that you will find on page 25. The other one is to demonstrate how to reconstruct dose internal exposures from gamma and beta emitters in the absence of gross gamma and beta results.

Also on page 26 of the white paper, request NIOSH ORAU to retrieve the urinalysis log book data for potential evaluation of exposures to special tritium compounds. What I would like to see is that all of the questions, there is many of them buried within that white paper, that they are answered in a timely manner and I would like to throw out 30 days to get that back into our hands, so that we can move forward with this issue for our next work group meeting. I am seeing how much time.

DR. ULSH: Okay, we are going to

need more time, I think. And you have to build into the schedule the time it is going to take not just for the normal reviews but we also have to have it reviewed by DOE for security plans.

CHAIR BEACH: Correct.

DR. ULSH: That has to be built into the schedule.

CHAIR BEACH: You are right.

DR. ULSH: So, would you give us 60?

CHAIR BEACH: Sixty days?

DR. ULSH: Forty-five? What will you give us?

CHAIR BEACH: Well, --

DR. ULSH: We will start on it tomorrow.

CHAIR BEACH: Okay.

DR. ULSH: Or no -- Friday.

CHAIR BEACH: I just -- we are going to have this come up many times in the next two days. So overall, I would like to

strive for something in the next couple of months to get papers out and back into DOE's hands and then back to the work group so that we can continue to move forward with the process.

So, if it takes 60 days, --

DR. ULSH: Well, six weeks? I'm looking at Don. I'm putting him on the spot.

MR. STEWART: Well yes, we can talk about my deliverables for the next 60 days after that.

DR. ULSH: All right. Josie, how about -- we understand your desire to get this done quickly. We will put our heads together after the meeting and send an email --

CHAIR BEACH: Okay.

DR. ULSH: -- to you and the other working group members proposing it.

CHAIR BEACH: And by the end of tomorrow, hopefully maybe we can have some idea.

DR. ULSH: Yes.

CHAIR BEACH: Because we will have many of these in the next two days that we are going to be struggling for time periods on. So, maybe --

DR. NETON: I think it is fair to allow us to talk offline.

CHAIR BEACH: Oh, I agree. I agree. No, that's all right.

DR. NETON: Because we are balancing a lot of different working groups.

CHAIR BEACH: And that is why I say, maybe at the close of tomorrow's work group, we will be able to kind of come into some kind of action items and time frames. I mean, that is completely viable to me.

So, is there any last comments? Paul, are you still on the line? Paul Ziemer?

MR. KATZ: Paul? Paul, are you still with us on the line?

MEMBER ZIEMER: Yes, I had to push *6 here to get back. Yes, I am still on the line.

CHAIR BEACH: Did you have any comments on this? I am just trying to push it ahead so that we can take a break here.

MEMBER ZIEMER: No, I agree. They need to move ahead. I understand the need for the reviews and so on. So, I think their 45 day target is good but it may take a little longer, based on the additional reviews needed.

CHAIR BEACH: Yes, and Paul, I wasn't just talking about the time. If there was any other additional comments you had just for this issue.

MEMBER ZIEMER: No, I don't have any additional comments. I think we have heard a lot of these issues before and a lot of the responses before. So, they keep reemerging.

CHAIR BEACH: Yes.

MEMBER ZIEMER: But I agree. A detailed response from NIOSH will be helpful so you can put some of these things to bed one

way or another.

CHAIR BEACH: Okay, thanks, Paul.

MR. STEWART: Yes, just one thing. We have gone back and forth about this a number of times. And I just wanted to say that I am grateful to see that the issues are here. I may have spoken out of ignorance in the past as to what the issues really were. And this paper goes a long way to resolving that. So, I just wanted to thank you.

MR. FITZGERALD: Yes, I don't think it really changed so much as we just wanted to be more specific.

MR. STEWART: Yes, there is more detail.

MEMBER CLAWSON: I have got just one more question. And this is getting, and I realize bioassay is a last line of defense but in some of the worker interviewers and stuff like that, they made the comment that I heard that they may have not been on the bioassay program but people in their group were in the

bioassay and were covered. So, they were saying that you know, they were meeting the requirements of what they had in the bioassay program.

Have you seen, and this came from some Mound interviews, you know, that people that they were working with were on the bioassay. So technically they were covered that way. And this is where, you know, I know bioassay is the last line of defense and everything else like that but seeing some of this and a lot of the data to me is very difficult to sift through and so forth like that.

MR. CHEW: Usually in that situation, Brad, they are people who were not exposed to like an incident but was following the routine just making sure that your program was complete. And then you certainly bioassay people with the highest potentials. Okay? And then the people who had the low potentials said yes, I was covered by that

particular group. Usually, there are no choices.

MEMBER CLAWSON: Because where I saw this mainly was in the maintenance departments, electricians, so forth and stuff like that. Because a lot of those rolled throughout the whole thing. So it was kind of like a spot sample to be --

The other thing I found very interesting and we see this complex-wide, Mound is no exception, is that they built one building on top of another building that was designed for this but now became this. And we saw a lot of this in the ventilation systems and the instrumentation lines and so forth like that. And this is what was interesting to me about Mound. The T Building, all these other -- it was like they were stacked one on top of another and we got into some issues down the road with some cracks and so forth like that.

But this is what is somewhat of

interest to me is that they said that everything was so cut and dry but these buildings were being used for things and glove boxes, some of the earlier glove boxes were not designed to really be doing what they were supposed to be doing and this is some of the people that were hands on. Yes, we made do with what we had.

And that is where part of my issue comes into this. And sure they monitored things and everything else like that. I just wanted to say --

MR. STEWART: Sure, the area will have been monitored and have access requirements to go in. It might have been an contamination area. It might have been a high contamination area. And the better the glove box was at maintaining the separation is going to determine a level of control where you can go in there.

And on the bioassay, certainly I have witnessed operations where I was not on

bioassay but the technicians that I was supervising were on bioassay. And though it didn't happen while I was there, everybody in the room came out and got a special because we had a lost containment.

So yes, okay, you know, Bob was an electrician. He wasn't in there. He was in there when this thing happened. Send them all downtown. And that is the way we did it.

MEMBER CLAWSON: And this is in the later years. I am looking a lot more towards earlier years up until the '80s. I know that, we understand our radcon program from '85 on has made leaps and bounds. Because really, to tell you the truth, we did not know a lot of the daughter products, a lot of the things, a lot of the potential that we were doing. I am saying this because we are all on a learning curve on this whole thing in the earlier years.

MR. CHEW: Also, instrumentation was developed to a higher degree of

sophistications so you can do that, too. And that doesn't necessarily mean that when you did the gross alpha on Pu-238 did not bound with the most contributing isotope. You know, we have to take a look at that.

MEMBER CLAWSON: Okay, thanks, Josie.

CHAIR BEACH: Anything else?

MR. STEWART: I had just one more question. As far as the thorium solubility types go, is this a Mound-specific issue or is this something that we need to look at on a complex-wide basis?

MR. CHEW: It was raised as a Mound-specific.

MS. ROBERTSON-DeMERS: Both.

DR. NETON: I'm not sure what the issue is here. I mean, thorium has different solubility classes like any other radionuclide. It is hard to detect in urine, which raises the missed dose quite a bit but it still is calculable. There is a number

that can be calculated if you have a urine sample and it has non-detectible thorium in the urine, albeit it is much larger than for plutonium or for uranium.

I am not sure what the issue is here. Is it that you come to implausibly high doses? Because the issues is if you come with a very high dose, it would probably compensate most lung cancers but most systemic organs, even with that high missed dose, would not put a PC over 50 percent for most of the soft tissues, the bladder, the pancreas, the GI tract, kidneys. So, it is a usable technique for us. I am not sure what the issue is here.

MS. ROBERTSON-DeMERS: It gets back to issues that we dealt with at Y-12 and the thorium processing. And I wasn't involved in the later portion of that. And the inadequacies of bioassay versus air sampling --

DR. NETON: Well that is a different issue. But I mean, if we have

bioassay samples for thorium, I am of the opinion and the NIOSH is of the opinion if we can use them to reconstruct internal doses.

MS. ROBERTSON-DeMERS: You have them for some periods.

DR. NETON: That's agreed. Now, if there is something, if there is another issue regarding representativeness of the bioassay program, then we can talk about that because that is a Mound site-specific issue.

MS. ROBERTSON-DeMERS: And the other thing is you need to look at your decision levels and so on and so forth because there is some highly insoluble thorium.

DR. NETON: There is S-type thorium. I am not aware of super-S thorium. I mean, if you are saying there is, then I would like to see some evidence.

MS. ROBERTSON-DeMERS: Well that what the paper that was generated by James and Weaver says is that there was YY in the ICRP-3 terminology thorium at Mound.

DR. NETON: I would like to see that. I have not seen it. And if there is, we can certainly deal with it in some way or another, I am sure.

MR. LaBONE: Can I make a comment on that? This is Tom LaBone.

On this, the solubility of the thorium from the Weaver and James paper, if you go back and look at that, they basically followed the dissolution of that material out for 75 days. And I would propose to you that you can't estimate 30,000 day half-lives from a 75 day experiment.

And I think that data is good to give us an idea of the initially soluble portion but I don't think it is very valuable as far as estimating you know, super YY or something like that.

So that is just again, after looking at the original report, that was what I came away with. And I just wanted to add that in, since the topic came up.

DR. NETON: Thanks, Tom. That was good. I had forgotten about that.

CHAIR BEACH: I think it is break time. How much time do we normally take, ten, fifteen?

MR. KATZ: Whatever you --

CHAIR BEACH: How about if we reconvene at 11:15?

MR. KATZ: Okay, 11:15 for folks on the phone. I am not breaking the line, I am just putting you on mute.

(Whereupon, the above-entitled matter went off the record at 11:02 a.m. and resumed at 11:17 a.m.)

MR. KATZ: Okay, this is the Mound Working Group. We are coming back on line. We had a short break. And I think Joe is going to present next.

CHAIR BEACH: Well, actually we are going to move on to integrity completeness of internal dose records issues, 12 and 13. And Joe are you --

MR. FITZGERALD: Yes. Yes.

CHAIR BEACH: Joe, you are. Okay, I had Bob down.

MR. FITZGERALD: I am just going to say, just to tee it off, this is the continuation of our review on the reliability question. We did split this thing into two parts. This is the looking at integrity and completeness of the data.

And our response to the ER, and again, the ER laid out a picture of where there was certainly complete records or relatively complete records and sufficient process descriptions, source terms to enable dose reconstruction. And our concern was that here was a need for a validation between the electronic records and the source information. Often times the paper records, whatever was the source information, be electronic just to demonstrate that in fact the electronic database is valid and one that can be relied on. And this is something we have done, I

think, with every SEC site.

That was a comment that we felt needed to be pursued. It wasn't specifically addressed in the ER. And we also cited in the white paper, or actually comments from last year as well, that we felt there were some short comings in terms of the completeness of the databases that would be relied upon. And again, as with the other issue 11, we are looking for clarifications, primarily because I think there were, since it wasn't really addressed for focused on in the ER specifically, we felt this is the step that needed to be taken. We need to at least ask the questions to get answers on it.

I think the NIOSH response, I am being very brief on this, was to disagree with the concerns that we had expressed. And at the time, I think, the comment was we ought to go back and take a look at the MJW QA documentation of what we have done in the, I think it was the early '90s and that process.

And also revisit the Meyer document we had reviewed but we certainly felt that okay, we can go back and take a look at that.

And at the time, the work group, this is going back I think to last summer, charged SC&A with doing a detailed review of both the MJW QA documentation, as well as the Meyer document, which we have. Now, that was a separate white paper, relatively recent, I think 15 or 16 pages. But this focused on the Meyer document and the MJW review.

And I think in general, you know, we found, you know, the Myer document does address I think a lot of the mainstream nuclides. We did find that it was incomplete in terms of addressing some of the so-called exotic or other nuclides. That was kind of the bottom line. There is more details in the white paper.

And relative to the MJW document, again, I think the QA process they followed is pretty thorough but we found some gaps that we

identified in that piece as well. So that is kind of how we addressed that particular task by the work group. And you have the white paper on that.

We also did a sampling of the bioassay, I guess the worker claims, the head bioassays. We picked 25 individuals. We picked a small sample. Again, we didn't want to get into a large-scale sampling but just enough that we could get a picture of how the various nuclides were addressed, in terms of potential exposures and what bioassays were available to be used in dose reconstructions. We looked at 25 claims.

That is addressed in terms of general conclusions in the white paper. We have the specifics on the individual claims that we used and we are providing that separate because that has identified Privacy Act information, providing that separately to NIOSH so they can basically see the details on the 25 workers that we chose.

And I think, without going into details, I will leave it to Bob to get into those details but we certainly did use that sample to highlight some questions that we have and some of them have already been raised about some professions about how one addresses the bioassay databases and how they would be used in dose reconstruction and whether or not it supplies a complete picture.

The other thing we did, we reviewed the July version of the roadmap. And I understand that since then instances have been added and it has been refined to a later edition. But I think a lot of it was in the July version that was useful. And we used that as well as the available bioassay databases to just look at completeness, pretty much in the same vein as Mel and his crew looked at, you know, whether you could map the nuclides and the locations and the timeframes with a bioassay technology.

We went further beyond the

technology to see whether or not the data, in fact, whether there were bioassay results available for certain time periods and certain locations. So it was both the technology being available but also what the status of the results were, what kind of data, in fact, were available as far as we could tell.

And there are some, I think, some fairly useful tables in the white paper that deal with both questions of the availability of bioassay, as well as the completeness of the data. I think table I and table II, I think are the key tables in that document.

That is pretty much where we are. So there are two white papers that have been presented on this issue. And Bob, you can --

DR. BISTLINE: Okay.

MR. FITZGERALD: -- get into the details of the findings a bit more. Those are thumbnails.

DR. BISTLINE: Yes. Joe said these papers really overlap a great deal in some

respects in dealing with the reliability of the data. And some of the points that are brought out in the paper on completeness are some of the same basic points that were brought out in the adequacy that we just have been discussing for the last couple of hours. So rather than getting into a lot of the detail that we have already had some discussion on, I think we will consider going into more of the completeness of the data and the review of the databases that we have done.

And on some of the points that we talked about before, again, it is reiterated here that NIOSH should demonstrate the feasibility of performing dose reconstruction to unmonitored potentially exposed workers and particularly NIOSH should demonstrate how they will reconstruct internal exposures from gamma and beta emitters in the absence of gross gamma and beta monitoring data.

SC&A assessment of plutonium urine bioassay data indicates that the electronic

file available in the Mound environmental safety and health system or MESH is complete and consistent with the raw bioassay records available for this evaluation with a few exceptions. So that data does appear to be pretty complete and very useful.

In the case of the polonium urinalysis data, a discrepancy was noted regarding the number of records in the POLON data file in MESH and the PORECON file, where the PORECON file contains several thousand more records than the POLON. The evaluation of POLON data to work on and the individual exposure records indicated that the three sources were not all inclusive of the data. And early fecal sample data and in-vitro monitoring data are incomplete in the electronic and individual exposure records. However, other sources of this information exist in log books and these data could be important in the assessment of high-fired oxide intakes or incidences.

Earlier, bioassay data for other radionuclides can be obtained from data sets complied by the MJW during the pre-1989 dose reconstruction effort. And the number of sources required to compile a complete internal monitoring history can be numerous and may not be available in MESH and/or the DOE individual exposure file for a claimant.

And one of the other issues that I will be addressing here some is the issue that the petition raises the issue of Mound plant employee health records being removed from Mound and buried in Los Alamos, New Mexico and the Nevada test site. Records buried at NTS were imaged into a searchable classified records database and imaged copies are available through DOE Albuquerque and the office of science and technical information. So, that addresses that issue or we will talk about that issue.

Joe mentioned that there are a couple of applicable tables that are

important, we felt, for NIOSH to look at, Table 1 and Table 2 in the report. And if you notice in that column, in those columns, years with bioassay data and methods proposed by ORAU to reconstruct internal doses, that there are numerous time periods for some of these radioisotopes where there is no data found and no methods proposed for the years that some of these specific isotopes' data, no method proposed prior to years with some of these isotope-specific data.

And so those tables are important to take a look at. And Table 2 is the internal dosimetry data for other radionuclides in Mound prior to 1990. And again, it breaks it out by 1960s, '70s, '80s and the number of workers sampled and the comments on the data that was found.

There is limited other radionuclide data in the 1960s, '70s and '80s, which typically do not cover all years when radionuclides were handled at Mound.

In the case of strontium-90 and yttrium-90, fission products, and radio tracers, no internal monitoring data has been located to date. Radium-226 bioassay results were available for the SEC period; however, they were not available from March first of 1959 through December 31st of 1989.

The results labeled as actinium-227 were not available from March 1, 1959 through December 31, 1989. However, thorium-227 and actinium-227 daughter were available starting in 1989. And I think, Brad, you touched on that issue during our discussion of the adequacy but it is reiterated in this completeness paper.

In summary, SC&A identified several concerns related to the appropriateness of the bioassay sampling program at the Mound site based on the review of the ORAU 2008 paper on major isotopes process material and bioassay roadmaps, and the availability of bioassay data from both electronic and hard copy.

The actual collection of bioassay data does not correspond to the years when materials were handled at the site, indicating that although bioassay procedures may have been available, they were not implemented for the entire period of potential exposure. NIOSH has not explained how they will address these gaps in monitoring data.

And in the absence of isotope-specific bioassay, NIOSH is defaulting to gross alpha analysis, which they have not demonstrated is inclusive of all alpha-emitting radionuclides at Mound. And again, this gets back to the gross alpha issue that we were talking about before the break some.

And in the absence of isotope-specific bioassay data for beta gamma emitters, NIOSH is defaulting to the gross beta results, which have not been located or to ratios derived from source terms and NIOSH has not proposed a method for assessing dose from these radionuclides where they compose a

majority of all of the source terms.

And for some radionuclides handled at Mound, such as iron-55, iron-59, iodine-131, strontium-90, prior to 1993, no proposed bioassay method has been provided by NIOSH nor does the roadmap suggest a surrogate approach. And approach for identifying bioassay gaps for potentially exposed workers should be developed and a determination made on whether feasible methodologies can be developed to account for these gaps.

As far as data comparison, as a means of confirming the validity of NIOSH's position on this matter, SC&A performed a comparison between primary and primary internal monitoring records, as Joe mentioned, and bioassay cards available, log books, and log data sheets or 24-hour urine reports and electronic urinalysis data for plutonium and polonium. A complete list of available data sources can be found in Appendix I.

The goal was to characterize the

integrity of the data in MESH, which is used as a principle source of the internal monitoring in the form of printout found in hard copy records and to identify systemic gaps that may exist in the data provided.

And as Joe mentioned, 25 individuals were identified available to work in the working group and that information will be made available. The goal in the selection of the 25 individuals chosen for evaluation was to choose claimants who worked at Mound through a majority of the SEC petition period and throughout the site on a variety of projects. And this information was determined from data available in the NOCTS.

In the evaluation of the 25 subjects for internal data completeness, it became apparent that compiling an individual's complete internal monitoring record required pulling data from multiple sources, some of which are not readily available in the electronic or hard copy files. This raises

questions about how data are compiled for use in dose reconstruction. And if a person goes back to Appendix 2, it gets into some of this. So we have some reservations with regard to completeness.

In the SC&A sampling evaluation of 25 former Mound employees for internal data completeness, it became apparent that the number of sources required to complete the internal monitoring history can be numerous and may not be available in electronic form. Given the circumstances, SC&A recommends that the working group request further validation regarding NIOSH's broad support for the completeness of bioassay records for dose reconstruction.

And Appendix III of this report, SC&A recommends to the working group additional completeness evaluations and/or records of retrieval efforts which further demonstrates whether data are available and can be accurately interpreted for dose

reconstruction with sufficient accuracy at the very least. NIOSH should be requested to demonstrate how they can effectively compile all internal monitoring data, including the data not available in DOE individual exposure record and the MESH files and demonstrate how this data will be used in dose reconstruction.

I would like to also get into a little bit on the issue of the offsite records. There was considerable time spent looking at the issue of the buried records, which we discussed previously and at previous times. The SEC raised concerns about the shipment of those records to Los Alamos and NTS. The issue becomes whether the buried records contain dose reconstruction data that are not available elsewhere and are critical to conducting dose reconstruction with sufficient accuracy.

And the evaluation report indicated that three former workers involved in the records transfer were interviewed and

extensive documentation related to shipment of records has been retrieved and reviewed, based on the information collected and reviewed. The ER indicates that the records did not contain data related to employee health records that would prevent the reconstruction of doses with sufficient accuracy.

And SC&A has expressed concern that the buried records may contain information relevant to a dose reconstruction that is not duplicated elsewhere. And this would include personnel monitoring, environmental monitoring, field radiological control measurements, incidences and health physics issues.

NIOSH has requested further clarification from SC&A regarding the basis of this conclusion, and in this report we have gone into looking at some of these issues to try to clarify this for you to respond to. And Mound did send records, there are 1639 potentially contaminated laboratory notebooks,

and these records contained financial data, scientific and technical reports, research papers and safety analysis records, facility safety analysis reports, litigation records, and classified drawings out to NTS. And SC&A recommends to the working group that an inventory of the imaged records be reviewed for potential relevance to the records of dose reconstruction and be declassified and retrieved, if possible, such as monitoring records that may be involved in some of that.

A shipment of 485 boxes of inactive classified contaminated or potentially contaminated records was sent to Los Alamos. And in 1998, 43 of the 458 boxes were returned to Mound from LANL in support of the pre-1989 dose reconstruction project. And this is something just reiterated here as a point that it has been discussed before.

But the point that I think is important is that in the inventories of these records, if you look in Table 3 of the

identified contents of the Mound documents recovered by MJW, you will find that there is a great deal of information dealing with urine analysis data, incidence logs, and, if I remember right, I think there were some, yes, there was nose swipes and polonium urine analysis data.

And the list appears to contradict the assumptions of NIOSH and the Mound records manager that no primary personnel records were present in the collection and that this classified collection by its general nature would not be expected to contain the kind of records described by SC&A. Although this particular subset of the 458 boxes was retrieved, imaged, and indexed, the questions raised by this review include the following.

On what basis were these 43 boxes selected? To what extent do they represent random sampling of a larger collection, as opposed to a complete targeted survey of all boxes that some likelihood of relevance to the

dose reconstruction? Did the retrieved data contain new information not duplicated elsewhere? And does such unique information, if present, contribute significantly to radiological matters influencing dose reconstruction.

Lab books were part of the burial, which may include information on personal dosimetry. However, nothing unique because that information in the notebook is not primary information; any bioassay or dosimetry records should be in the individual's personnel file. This is the response which NIOSH has provided and the MJW health physicist involved in the LANL records review in March of 1998 stated that -- this individual was 99 percent sure that no bioassay data were overlooked in the retrieval.

But it was found that, in looking at the data though, that two individuals had data in the polonium log book records shipped

to LANL that were found missing from the polonium database, three individuals had data in the polonium log book records shipped to LANL that were collected prior to the earliest data for the individuals in the polonium database, and the fecal data identified in retrieved LANL logbooks were not available in other record sources at Mound.

So the conclusion made attempts to contradict the assumption of the ER that the records buried in LANL were not found to contain primary employees' records. And there is a list of issues here that are brought out in this white paper.

In the ER NIOSH references interviews conducted with three former workers, two former record managers, and a researcher, and NIOSH makes no reference to an additional interview conducted with a former Mound health physics person who had an opportunity to review the contents of 26 boxes prior to their shipment to LANL.

In this interview, NIOSH was provided with a brief inventory compiled by the health physicist indicating that environmental monitoring, personnel exposure, incident, and other information was included in this subset and reviewed. In fact, this information is available in the site research database within the Mound records transfer history by Long in 2007.

And SC&A provided the list of boxes to OSTI to determine if any of these records were available in imaged form. The column in Table 4 indicates whether or not images of the boxes' contents were located in OSTI. Of the 26 boxes reviewed prior to shipment, OSTI was able to locate images for records from 13 of the 26 boxes. And the remaining 13 boxes that are not available to OSTI are presumed to be buried at LANL. This further corroborates the fact that these box numbers are not included in that review.

And so you can see in Table 4,

there is a listing of the records and bioassay procedures for actinium, health physics personnel monitoring data, procedure development for urine and fecal analysis, urine analysis spikes, and radium analysis procedures are some of the kinds of records that were in there.

In summary, the petition raises the issue of Mound plant employee health records being removed from Mound and buried in Los Alamos, New Mexico and NTS. Records buried in NTS were imaged into the searchable classified database and imaged copies are available through DOE. There is no indication in the ER that these documents were screened for records pertinent to the SEC petition. And the records sent to LANL were never thoroughly inventoried prior to their disposal except for a small fraction of the 458 boxes that were inventoried in some detail.

And these reviews of the records indicate that the radiological data include

urine analysis, fecal, and monitoring incidence, animal studies and procedure development. The ER does not provide an adequate description of how NIOSH verified these buried records, particularly personnel monitoring records were available elsewhere. And the ER does not document any verification that classified monitoring data within the LANL record set and other classified record sets were captured in unclassified sources.

So with the limited information available regarding the contents of the buried records, their relevance to dose reconstruction and their relevance to the development of the coworker or bounding models, whether they are critical to conducting dose reconstruction with sufficient accuracy is indeterminate at this point.

MR. FITZGERALD: I don't want to run too tight on time.

DR. ULSH: Oh, 12:30. Right, okay.

MR. FITZGERALD: I might add for

those on the phone, these are fairly detailed 50, 60 page white papers. So we are putting Brant at a little disadvantage. But he has had them for a few weeks.

DR. BISTLINE: He's a fast reader.

(Laughter.)

DR. ULSH: Again, we will be issuing a detailed response to this report. And just like our discussion earlier this morning, there are a lot of issues laid out on the table here and I am not sure that we are going to be able to address all of them.

But we are looking forward to looking at the data for the 25 individuals that you reviewed. I know that Kathy is in the process of getting that data for us. So we will take a good hard look at that.

With regard to the buried records issue again, I knew that as soon as this was in the evaluation report, as soon as I saw it in there, I knew that we would be dealing with it over and over again. We will, of course,

look at what it's in your report, but I can already give you a preview of what is going to happen, where we are going to wind up. We interviewed the people who exist with the most relevant hands-on information that is available. And that is the records manager who was involved in the transfer of these records, and also the MJW health physicist who happens to be on the line. Right, Liz?

MS. BRACKETT: Yes, I am.

DR. ULSH: Hold on. It is hard to hear you, Liz. Can you speak up again?

MR. KATZ: Go ahead again, Liz.

MS. BRACKETT: I am speaking directly into my hand set.

MR. KATZ: No, no. The volume was turned down here. It is my fault.

MS. BRACKETT: Oh, okay.

DR. ULSH: So Liz, I will give you a crack at it in just a second.

MS. BRACKETT: Okay.

DR. ULSH: Liz is on the ORAU team,

and she was the health physicist for MJW who went down and reviewed these records. So she can talk a little bit about how she chose the records and what she found.

These are the people who are directly involved with this issue. And we have interviewed them. We have told you what they said. And at the end of the day, what we are going to have is simply a weight of the evidence approach. We will address the issues that you brought up about some of the records that were in there. But the urinalysis and other records that you mentioned were not, in most cases, far and away most cases, were not unique, where not the primary bioassay data.

So at the end of the day, it is going to be the word of the people who were involved in this versus speculation about what might be in those boxes. That is just where we are going to wind up. There is no more information short of getting a back hoe and going down there and digging these things up -

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MR. FITZGERALD: Let me just intercede. I mean, I agree this is a tough one just because you are dealing with recollections and what have you. But is there a pathway where you could validate what isn't at OSTI that was scanned and stored there? I seem to think that was -- the only thing that we could come up with was just to validate the essential. And what were the records that ended up in those locations or collections from that, the so-called buried collection? I can't recall if that was done.

I know that we discussed that. That was the only thing I could see other than that you were saying, based on recollections and whatnot.

DR. ULSH: Liz, do you want to jump in and make your comments?

MS. BRACKETT: As you already said, I am the health physicist that is mentioned in here. And then there are some quotes from MJW

documents that are misrepresented here in their application in actually several spots. The rebuttal, to my recollection, I mean, the 99 percent sure, that was just my feeling that we had found all of the polonium data. That wasn't necessarily saying that it was from Los Alamos or that we looked at everything from Los Alamos. But the quotes that follow are from the Phase I interim report from MJW. This is not the final report and, in fact, all of these paragraphs that discuss records stored at Los Alamos are justification for going back to Los Alamos and getting records. So this predates the looking, the review of most of the records.

DR. ULSH: Liz, where are we talking about?

MS. BRACKETT: -- is that we are contradicting the ER. That in fact is not correct.

DR. ULSH: Liz, the quotes that you are talking about, where are they in the white

paper?

MS. BRACKETT: Page 28 of the data completeness document.

MR. FITZGERALD: And Liz, is there something that you are saying this predated the retrieval. Is there something that was more current that followed?

MS. BRACKETT: There is a Phase I final report which I would like to quote from.

MR. FITZGERALD: Okay.

MS. BRACKETT: Well Brant said that I would speak to how I chose records. I did not collect the records to be reviewed. I don't recall how that was done. I am sure that Mound was involved because they were the ones who shipped the records. I had no knowledge. I don't recall if I reviewed any inventories or what the process was at the time. So I am afraid I can't elaborate on that any more.

But if I go to the Phase I final report, we did review a number of log books

returned from Los Alamos, and they sent us copies. They didn't necessarily return everything. There was, I think, an issue with some of them being potentially contaminated. So rather than ship them back, they made copies.

And in addition to reviewing those, we reviewed microfiche data, microfilm and microfiche that was located at Mound and had always been there, had not been shipped. And the Phase I final report says that we have reviewed over 5,300 historical log books either in hard copy or on microfilm. And it says what was discovered during the review of the logbooks or microfilm at Mound was that all of the Mound logbook data retrieved from Los Alamos in March 1998 and requested hard copy material returned from Los Alamos in 2000 was recorded on these microfilms. So this says we found absolutely no new data coming back from Los Alamos. All of it was still onsite at Mound.

MR. FITZGERALD: So really, you are categorically addressing, I think, the heart of the issue. You are saying quite apart from some of these quotes, you can attest that all of the relevant --

MS. BRACKETT: I am not personally attesting. I am reading the Mound final report. The MJW Mound --

MR. FITZGERALD: Okay, you are saying MJW is attesting to the completeness.

MS. BRACKETT: I am saying that is what was written in the report ten years ago. That is what the report says, that all of the log book data that was retrieved from Los Alamos was found in microfilm. So I would assume that that is correct. That wouldn't have been written if it wasn't an accurate statement.

DR. ULSH: Now, of course, you can always speculate, well --

MS. BRACKETT: Yes, we didn't review everything. Obviously, we didn't

review all of the books. So I am not saying that -- I am not categorically saying that everything that was at Los Alamos was at Mound. But what we looked at, all the data that we looked at, we found again in microfilm on the Mound site. It was in the basement of A Building, I think. It was in the classified record section where there were lots of microfilms in a safe there.

MR. FITZGERALD: Yes, so you are a source of validation, though, since you had actually looked at the Los Alamos data and looked at the later microfiche.

MS. BRACKETT: Yes.

DR. ULSH: So what we can say is the weight of the evidence being 5,000 log books that were looked at were verified to be present on fiche at the Mound site. Can we prove to you that there is another 5,000 buried in the holes that were not there? No, and we are never going to be able to. But there is no evidence to suggest it. That is

our position. So --

MS. BRACKETT: I had asked before. Is this microfilm still available anywhere? It was at the Mound site in --

MR. FITZGERALD: Well that got to my other question about -- I thought the way to put this to bed originally was just to find the records wherever they went. And I thought maybe OSTI was the location. If we could make that one last step, I think that would kind of put this to rest.

I mean, I think your validation is valuable, but I think that would actually, if you could find the microfiche or find out where the microfiche went or where it was copied, that would kind of --

DR. ULSH: Well, I understand. What I hear you saying is that this collection of microfiche, if we can locate it, verify that it is at OSTI or somewhere else, the question --

MS. BRACKETT: I believe it is

microfilm not microfiche.

DR. ULSH: Microfilm.

MS. BRACKETT: I misspoke at first.

DR. ULSH: Okay, so you are proposing that as a follow-up action item. I understand. But even if we do that, someone could still speculate and say that there are others that you didn't look at.

MR. FITZGERALD: These are just degrees of validation. I think, you know, originally it was one of these that didn't seem to have more validation than just a recollection. I think what Liz is pointing to is something a little stronger. And locating the microfilm would be a little bit stronger. Would it be 100 percent? I don't think so. But I think this was raised in the petition and certainly is, as you pointed out earlier, Brad, is a kind of compelling completeness question to address, even though I think we would admit that in the end, you can't be 100 percent able to validate, but I think we would

be able to validate to the extent possible.

I would think the trail for the microfilm, I mean, I think the Mound records went only in a couple different, two or three different directions. So you might be able to, you might be able to substantiate where they ended up.

MS. BRACKETT: I had asked about this a few times, but I don't know if it was ever followed up on anywhere.

DR. BISTLINE: Liz, this is Bob Bistline. I was just wondering when you were reviewing boxes or inventories, I should say. Was the emphasis really on internal and external radiation exposure data, or did it include area sampling, air sampling, and those sorts of kinds of information as well?

MS. BRACKETT: It was, actually it didn't include external data at all. We were focused only on internal. I don't recall. When we were looking through the boxes, when we were doing the review of the microfilm, we

had several Q cleared I think former employees from Mound, some retired folks. And I know that they did pull up process lab books. They were looking at that to see if we could look at processes and air monitoring and all. But to be honest, when I was at Los Alamos looking at log books, I don't recall if we were looking for that or just bioassay data.

But like I said, when these other individuals who weren't health physicists, they had been operational people, they were looking at a broader scope than what I had been focused on, I think.

DR. BISTLINE: Okay, thank you.

DR. ULSH: Okay, so that is the buried records issue. Josie, I am sure you are going to sum up what the action item is on that. But I think it is we go and look to see if we can test whether or not the microfilms against which these log books were compared are in fact available at OSTI or somewhere else. Right?

CHAIR BEACH: Right.

DR. ULSH: Okay. There were a number of other issues, Bob, that you laid out. And like I said, I don't know that we will get to all of them. You mentioned the roadmap. I guess we are going to talk about that a little later so I will save that for then.

You asked how dose reconstruction will be done for beta and gamma emitters in the absence of bioassay. Right? I think. Yes. You want to handle that? Especially strontium. I know that strontium was mentioned.

MR. STEWART: Yes, and go back to Table 1. If we could just talk about Table 1 for a while, I think we could iron a lot of these out. I assume that when we see comments in bold, those are the salient points, as far as SC&A is concerned?

MR. FITZGERALD: Yes, I think those are the question points --

MR. STEWART: Okay.

MR. FITZGERALD: -- that have -- and this is sort of a short version of a roadmap in a way but it is based on a roadmap.

MR. STEWART: Sure. I have some comments and some questions as well.

MR. FITZGERALD: Right.

MR. STEWART: Some clarification questions for our response here.

We talked a lot about actinium so I won't address that here. We will skip over americium because there is no bold statement in there. When we get to bismuth-210, there is no method proposed prior to years with Bi-210 specific data.

If you are talking about the precursor to polonium-210 as part of the polonium process, I think the polonium bioassay would be conservative in that case. Bismuth-210 has a half-life of five days and the polonium-210 would grow in rapidly. Also, if you compare the DAC values as, I didn't

realize we don't use DAC values as an index of the radiotoxicity. The radiotoxicity of bismuth-210 is a factor of 45 less than the Po-210. So, that would be one of those cases where you would look for the needle rather than the haystack. Because Po-210 bioassay was commonly conducted at Mound.

Skip over to cobalt-60. This is not, again, not a pervasive radionuclide at Mound. Not something that I would assume a presumptive exposure to any individual onsite. So this is connected with certain processes. So what I am going to need to do is look at the roadmap, see what these time frames are and go back and look.

A number of times and I am sure this has been pointed out before but I will just belabor it. King can be unreliable in some circumstances, and his dates are not always correct. And also, he also lists material whether it was available for uptake or not. So it is not a hundred percent guide

that said this is in the atmosphere available for our person to have an intake of.

So cobalt-60 I will want to look at that. Cesium-137, you know, we just didn't do a lot of work with that or cobalt-60, as far as I could tell. So we are going to have to see where in the roadmap this comes up and, you know go back and look at it.

The next item, iron-55, iron-59, these dates indicate that this is associated with a reactor waste purification program. We did talk about a dose reconstruction methodology for that technology, which was ended at about that time frame, '54, but in fact, the health and human services designation letter does not state that we can reconstruct that.

Tritium, we will skip.

Iodine-131, the time frame here is '76 to '81, and I am trying to understand where that could have been an exposure. I did find one area where it was used to test a

waste disposal methodology. And so if anyone happens to know off the top of their head what process this is referring to, I would like to check that out.

MR. KATZ: We can find it. It is in the roadmap.

MR. STEWART: The only one I could see that I saw on my quick look through there was a process they used to test a method for cleaning wastewater, and that was from purchase of 10 millicuries of radioactive material. Iodine, cobalt, cesium-137 and strontium-90.

No, I would say there is probably no bioassay for that but we have an amount and we can bound the dose. If there are other instances of that, you know, we can look at those as they come up.

Manganese-54, I don't have a method for that. I didn't see it because it is in the Appendix B so I haven't looked at that issue as yet. Polonium-210 daughters, anybody

want to say anything about that? Anybody have any further information on why that is in there?

MR. FITZGERALD: Yes, some of this is off the roadmap, but we will have to sort of go back and forth.

MR. STEWART: Polonium-210 has a single daughter, stable lead-206.

Skip down now to strontium-90. It keeps coming up. There was some radio separation work done by -- and it is documented by a couple of published papers. This was done with a stock solution that was used, and I don't remember the exact dates. It was used to test a separation method. And then the same stock solution was used ten years later. We didn't come up with a method to do that. We said, we know who those two individuals are, and we can bound it with assumptions about the amount of stock solution they would have used.

The amounts are all written in the

papers. There may be other instances where it would show up. I see that that was a part of the waste disposal methodology test. We can look at that.

Thorium daughters. It is true that you won't see bioassay for thorium daughters because, once again, you are typically looking for the haystack rather than the needle in this case. But the current TBD has a methodology to assign equilibrium amounts of the daughters. It is in Table 5-7. So what would happen if you had a positive thorium result, the TBD would drive the dose reconstructor to assign equilibrium amounts of certain daughters. So that methodology is there. But we wouldn't expect to see bioassay for each of those. And that is the last of the bolded items.

Okay, now we go to other radionuclides. Other radionuclides are an issue, and I also do some work for the Los Alamos site. So certainly that is an issue

there as well. I believe of these we are going to leave this for the detailed response, rather than go through each one of these. But once again, I will just point out that these don't compose, for the most part, they don't compose presumptive exposures for the entire universe of Mound workers. Now our approach will certainly take that into account.

MR. FITZGERALD: You have done a number of dose reconstructions on Mound. What are you doing now with these certain other or exotic nuclides? Do you have somebody that -- I think this was a question that was raised a little earlier.

MR. STEWART: Right. Yes, and I have seen those data indications. They are not common. You don't expect them to be common.

MR. FITZGERALD: Right.

MR. STEWART: When you see a process operator working SM PP, you expect to see 238 as a DR. And you see 238 for that

operational career. You don't ask questions. You assign the dose and then you move on from there.

And certainly the numbers of individuals involved are against us here, as far as seeing all the other radionuclide data because there is a very large number of Mound workers. Fortunately, a small number of them have contracted cancer. And of those, not all have put in claims. And so any one dose reconstructor may not even encounter a person who even had a possibility of --

MR. FITZGERALD: Well, I was just wondering how you flagged. It may not be a bioassay result, so much as where they worked operationally. It just seems like --

MR. STEWART: And that does come up. Certainly, it does. What you will see is, is you will get a partial picture from each record that you review. You'll look at the interview. You will look at his or her area of employment. You know, we'll certainly

look at the bioassay records. And you will ask yourself, are these records consistent with what this person says he was exposed to?

I always go back to this certain claim as an example because it is a claim that had early employment at Mound, which means that full external dose records are included. The guy was one of those guys that did these chemical processes, he was a chemist, and a number of polonium results, sure enough, he wrote a couple of chapters of the book Polonium. So certainly that polonium data is consistent with what he had talked about or with what he had done, his work, his published work while at the plant.

Oh, by the way, he was involved in an incident where he was possibly exposed to some pure radium. Well, we don't talk a lot about pure radium in the TBD, but he happened to be working with some. And in the claim file were records of bioassay and records of the incident as well.

So, in that case, I said okay, the data in the interview corresponds with what I am seeing in the record. Now as a dose re-constructor, when I would start to ask questions would be what if he mentions an incident and he doesn't have something? And it certainly happens.

I think I brought up case number one before. It was a Mound employee, and there were a number of unanswered questions for that case. And really all that was available to us were overestimation methods. And that is what we did. The guy was still around. A very informed person, scientist, knew a lot about what he had been exposed to, and DR took forever. And basically, we just had to come up with some outrageous doses because we just didn't know.

Were they accurate? No, not at all.

MR. KATZ: But they were over estimating it.

MR. STEWART: They were over estimating it.

MR. FITZGERALD: I'll give you an example. I was interested in you mentioned you really knew the two people that handled strontium-90 solutions. I mean, it was sort of like you key in on those individuals to be able to address that.

For example, the worker that might have worked on some of the reactor residue or whatever in the early days. Yes, I look at notions there is really no fission product monitoring.

MR. STEWART: Right.

MR. FITZGERALD: But you know, you could certainly, just by virtue of the activity, figure out that might be a potential there.

MR. STEWART: Sure.

MR. FITZGERALD: But you know, without, you know, we are looking at this and, well, there's no real results. How would you,

you know, factor that in, if there is not a basis?

MR. STEWART: Since the HHS designation letter came out, I wouldn't.

DR. ULSH: Well, a couple of things to keep in mind, Joe. In terms of the reactor waste program where you are going to see the fission products, that occurred in the early '50s, which is during the SEC period.

MR. FITZGERALD: But there was, I mean I guess we hadn't talked about later, but I mean, you are saying basically again the presumption is that there really isn't any residues until perhaps the D&D period.

DR. ULSH: Yes, I would say so. I mean, not for fission products. It was such a small, short-lived program.

But to answer your larger question, for these situations where we know exactly who was involved, the strontium example, our assertion is the thorium program would be one. We will get to this later, but the most

insoluble of the metal tritides, we know exactly who could have been exposed to that.

I think what we would do certainly going forward. I mean, you may or may not be aware that the Mound TBDs are under revision. A lot of that is going to try to capture the outcome of this process. But when that revision happens, I think what we would do for those situations where we know exactly who was involved, we would want to compile that somewhere so that if we get a claim in, we can flag that person and say okay, he should be considered for this particular element.

DR. ULSH: Yes, but let me just tell you. I mean, it sort of keys in on you either know who the individuals are, you know the activity. There are two or three different flags, or you just pick it up by virtue of what they volunteer in the CATI interview or something. If that were the process, then I think a lot of these would be addressed.

Now there are some that I think, you know, it is unclear to me how you would address it because it is difficult for an individual to know they were in the operation or the time period or whatever. And D&D is another question entirely. But certainly that would be a method to tag a small number of potentially exposed workers to a particular nuclide and address the ability to monitor, the ability to do dose reconstruction.

MR. STEWART: Sure, and that is a comment, peer review comment, that we get a case sent back with DR is that, you know, the individual described some potential exposures that you didn't address. You know, why didn't you look at this particular radionuclide.

MR. FITZGERALD: I guess what we are coming to this is also in the adequacy, is what is the strategy or approach to addressing other nuclides. You know, not the mainstream but the other nuclides. Not involving a lot of people. Very specific operations. Very

specific narrow time periods. Certainly, you are going to come across them but not very often. And what is the approach?

And I think when we look at the ER, I think we can understand it and it is very clear that the mainstream nuclides were addressed pretty thoroughly and there was a lot of data, clearly. But for these sort of cats and dogs, these other nuclides, and this is the same with other sites, it wasn't quite as clear in the ER what the approach would be.

And I think beyond all this sort of analysis of where the holes and gaps are, I think that is the underlying question. What would you do? What is the strategy for making sure that, you know, even the absence of data, the exposure potential is recognized and something is done.

DR. ULSH: Well, I think in terms of -- this is an issue that may pop up later. I suspect it will, demonstrating sufficient accuracy, you know, that whole issue. I think

what we would be obligated to provide to you would be a sample dose reconstruction, where we would show how we would address potential exposure to some of these other radionuclides. That I would certainly agree is something that we need to --

MR. FITZGERALD: Yes, we are kind of -- that is kind of what we are talking about is --

CHAIR BEACH: You are talking about a basic walkthrough from the start of dose reconstruction how you handled it and what you just said.

DR. ULSH: Yes, I mean, it is typical that a sample dose reconstruction is going to be provided for other sites. It would actually be a dose reconstruction report for a fictional claimant, of course, where we would demonstrate that methodology.

Now, in terms of -- I mean, there is a couple of questions wound together here, Joe. One is can we demonstrate a bounding

technique. That, I think, is a valid SEC question we need to answer.

MR. FITZGERALD: Right.

DR. ULSH: But in terms of who you apply that to, and this goes back to the discussion that we had at the previous working group meeting --

MR. FITZGERALD: I know. Right, right.

DR. ULSH: -- that will probably come up later.

MR. FITZGERALD: Yes.

DR. ULSH: Our position is still that that is not an SEC issue. That is a dose reconstruction issue. I know that there may be some dissension on that.

MR. FITZGERALD: I know. I would -- it is getting closer to lunch. So I would like to unpack that question about the bounding model bounding approach versus the enabling parameters or data that would make that model feasibly useful at a particular

site. And I think maybe to some extent with stable tritium compounds and some of the other issues, we are going to get into that. I mean, I think that is a central question. We don't probably need to do it now but we are going to have to get into that question.

But I think we have an honest disagreement about whether or not one can refer to the implementing data, the site-specific data that would enable that model to be effective and feasible to that site, to be a site profile question. But, you know, I think we have touched on it, but we really haven't had that discussion. So I think it is a good discussion to have.

DR. ULSH: Preview of things to come.

MR. FITZGERALD: Right.

CHAIR BEACH: I think Kathy.

MS. ROBERTSON-DeMERS: I have a question. Okay, you go to the employee file and you look at the CATI interview when you

are doing the dose reconstruction. And we have demonstrated that it is not complete. It doesn't have all the bioassay data. So what do you plan on doing with respect to all the other bioassay data that is out there? Somebody may say I was involved in the radium or thorium processing, but the data may not be available to you, and you may assume that they aren't because the data is elsewhere.

DR. ULSH: Well, you made a statement there that I think we are going to have to evaluate. And that is that you have demonstrated that the data are not complete. I assume when you say that, you are talking about the dosimetry files provided to us by the Department of Energy.

MS. ROBERTSON-DeMERS: Right.

DR. ULSH: Okay, now keep in mind that is a statement that was made in your white paper that we have not yet responded to. So I am not prepared at this time to grant that that is the case. We have to take a look

at it and we will respond. But we haven't, I mean, we haven't look at that yet.

MR. FITZGERALD: Well, we did touch on the fact that there are going to be instances where the data just isn't available for whatever reason. And that gets into, you know, location-specific, activity-specific operations. And there is other tags that one can use to get into a application of a --

DR. NETON: We have encountered this before a number of times --

MR. FITZGERALD: Yes.

DR. NETON: -- I mean, where you have laboratory sources and quantities and I think we can produce, for those kind of situations, bounding values based on what happened or what did happen.

MR. FITZGERALD: Yes.

DR. NETON: I mean, because the chemist working with liquid solutions and is doing some extractions and never goes to dry, I would question whether there was any

potential for an inhalation exposure, anyway. So that becomes very much a case-by-case analysis.

MR. FITZGERALD: Yes, and it is a familiar discussion. And we have had it at various sites. In some cases, it covers everything but. And there is some good reasons, whether it is fission products at Los Alamos. There are good reasons why you just can't get there from here.

So we are at that process where we just sort of identify what seems to be the holes, but I suspect that we will hear and understand how those holes will be addressed in terms of an upper bound approach. That is kind of where we are at now.

MR. BUCHANAN: I have a question. This is Ron Buchanan. You do not presently have a list of these 20 or 15 or 5 people that when a person does a dose reconstruction and says hey this guy was assigned to this group of five or something of these special

isotopes.

Right now, you look at where the person worked and say well, we should investigate this, maybe. But you don't have that in place at this time. Is that correct?

DR. ULSH: It is not our routine policy right now. I mean, for instance, let's talk about special metal tritides, the most insoluble of the tritides. We know who the dozen or so people are. We don't currently flag every Mound dose reconstruction to bounce against that list of 12. That is something that we are going to need to implement.

Does that answer you question?

MR. BUCHANAN: Yes, thank you.

CHAIR BEACH: Okay. And then from a Working Group standpoint, I would like to request NIOSH, of course, we have mentioned it a couple of times, answer in detail the SC&A's white paper with a, you know, response to all the questions that were asked within the Appendix 2 and 3. And then once again, I am

going to push for an end date in the one to two month time period. That may be tomorrow at the end of the day, as we discussed with the first white paper that we will come up with some kind of a closure time to have a white paper on the table for the working group.

Again, if that is acceptable.

MR. STEWART: I would suggest we consolidate this paper with the one we reviewed before the break.

CHAIR BEACH: Consolidate them into one white paper?

MR. STEWART: Our response. Our response.

CHAIR BEACH: That's fine.

MR. FITZGERALD: It was, actually, one consolidated paper but it got to be a little unwieldy so we split it. But that is fine.

CHAIR BEACH: Yes. My concern as long as the questions are answered within

there, that is fine.

MR. FITZGERALD: Yes.

CHAIR BEACH: Anybody else have anything from the Work Group?

MR. FITZGERALD: Well, I would support the suggestion if not know some point to walk through some of these sample dose reconstructions just because I think it would clarify, you know, pretty much where this all started from. You know, we couldn't really get from the ER what the approach would be for these other nuclides. I think we touched on some of the possibilities, but it would be much clearer if we could see a few samples. And really one step is to sort of test the envelope. You know, there are several possibilities here that you could certainly run through, and that would kind of push the envelope and say okay, this is a pretty tough one. I mean, there is no data and you would have to do this or that. But that would be helpful.

CHAIR BEACH: Well, and I think Brant agreed to do one, but how many would you like to see?

MR. FITZGERALD: I would leave it up to NIOSH. I think it would test the issues which, you know, we have talked about multiple exposures, we talked about exposures where there is no data. You know, just some of the ones that will be the harder ones. If you happen to know the two people that were exposed to strontium-90, I wouldn't propose we do that. I think that is a lot clearer how you would approach that. But the ones that, from your vantage point would challenge the dose reconstructor. I am not saying it is not doable but would be a challenge.

I think that would help understand what the approach would be for some of these exotics without spending a lot of time. Because I think the matrixes are useful but the how part is the part that is going to be the most valuable.

MR. STEWART: Sure, and I think a lot of the issues that we have gone back and forth on are fundamentally understanding issues between how we do it and how -- it is just not easy to communicate --

MR. FITZGERALD: Well, I don't want to spend time talking -- in a sense what we are saying is well we see there is no results, and the implication is how can you do it without results. I would like to see it is sort of okay, what is the approach. You acknowledge the results are not plentiful, but how would you go about doing the ER. I think that would help.

CHAIR BEACH: With details. And so I have got three action items out of this discussion. Does anybody else?

I had NIOSH respond in detail to SC&A's data completeness white paper. And then I had locate the microfilm from Mound for SC&A to look at, and then the sample dose reconstruction, which could be in addition to

the detailed answer. But not to lose focus of any of those.

DR. NETON: Did we actually agree to take that action item to find the microfilm? I mean, I think it was open for discussion.

CHAIR BEACH: Oh, was it?

DR. NETON: I don't recall that we said we would go find the microfilm. Did we?

CHAIR BEACH: I am sitting next to Brant. I am pretty sure I heard him say that.

DR. NETON: I still wonder what the value of finding it is, other than to say it exists. It is not some fictitious cadre of microfilm.

MR. FITZGERALD: Well, I think there is certainly a universal sense that the only thing we have is recollections. It would be useful to know that whatever was generated, what Liz was pointing to is in fact still in the holdings. I think the petitioners raised it, and it is in the ER, and it sort of has

been, I think, Brant characterized it as sort of a bit of a problem because there is no way to really --

DR. NETON: Well see my problem is, I mean, that creates the expectation if you don't find it there is some hole. And I am not sure that if we never found it, we would change our approach.

MEMBER ZIEMER: Josie, could I make a comment here?

CHAIR BEACH: Yes, Paul, please.

MEMBER ZIEMER: Well, I don't regard the MJW report of ten years ago recollection. The report is the report. So I think that has its own level of reliability. You know, you can accept what they found.

The question of whether or not you have to go back now and find those things that they looked at seems to me problematical.

MR. FITZGERALD: To find the microfilm is problematic?

MEMBER ZIEMER: No, no, I am saying

that clearly they exist or existed, and the verification was done at that time. That is not just recollections. I mean, you have that report.

DR. ULSH: Well, you raise an interesting question. I think if Liz -- Liz, are you still on the line?

MS. BRACKETT: I'm here.

DR. ULSH: Okay. Well, when you say that the log books were found in the microfilms, I assume, and you jump in here and correct me if I am wrong, but any bioassay data that was found was incorporated in MJW's databases, the PORECON and PURECON.

MS. BRACKETT: Yes, and in fact, I meant to point this out earlier, too. In one of these white papers, I think it might have been the quality assurance one rather than this, but there is mention, there is quotes from MJW saying that there were gaps in the log books that we didn't find. But in fact, there is no gaps in the data. So the log

books weren't the only source of bioassay data. The were cards also. The log books were used only to verify data that were already there.

So when we found log books, we verified data that we had, and I guess there are some instances where we found data that had been missing. But anything, in that case, would have been entered into the database.

MEMBER ZIEMER: Well, we can discuss that further. I just wanted to make that observation. Could I make a couple of other comments at this point?

CHAIR BEACH: You bet.

MEMBER ZIEMER: Yes, one is more of a question. Josie, did you distribute six documents? I have only located three, and I think the ones that we have discussed I don't have.

CHAIR BEACH: You were actually, I sent you three that were cleared documents.

MEMBER ZIEMER: Okay.

CHAIR BEACH: And there were others that were supposed to come out this morning that I have not seen.

MEMBER ZIEMER: Oh, okay.

MR. KATZ: But Paul, they weren't sent out in cleared version, you know, privacy and reviewed version.

CHAIR BEACH: Thank you.

MR. KATZ: But they were sent out previously in the protected version.

CHAIR BEACH: Yes.

MR. KATZ: So you would have received them all much earlier than that.

MEMBER ZIEMER: How much earlier?

MR. FITZGERALD: April time frame.

MEMBER ZIEMER: Oh, okay. Then, and I will go back in my other files and see if I can pick those up but I only have the three here with me.

The other comment, and this deals with cesium and strontium and I think those are minor players in reality. But I just

wanted to point out that for the time periods of the 50s and the 60s, virtually everybody in the country had body burdens of cesium and strontium that were detectible and, in fact, I know when we did whole body counting through the '60s of non-nuclear people from anywhere, we always had interference of cesium from atmospheric weapons testing, even though the testing in the atmosphere ended in the late '50s, you still detected it in people's bodies on through the '60s. So, if in fact, I don't know if anyone is using gross beta for those urinalyses, but it would be very surprising if you didn't see cesium anyway. It certainly was easily detected with whole body counters. I don't know how readily you would see it with gross beta urinalysis. But it certainly was there. And the same is true of strontium.

In fact, you might recall the concerns about strontium in children's teeth through that period, just as a comment on the fact that there was a background body burden

to start with.

MR. STEWART: Yes, and that is taken into account in our TBDs, we use NCRP guidance to look at those background levels so when we see cesium-137, we will usually subtract it out.

MEMBER ZIEMER: Use that baseline.

MR. STEWART: Yes.

MEMBER ZIEMER: Okay, very good.

MR. STEWART: Yes, and just to clarify one point that seems to be coming up regularly at these meetings, we don't use gross beta at Mound.

MEMBER ZIEMER: I didn't think so. Someone was talking about it earlier.

MR. STEWART: We had an unfortunate, I think, slip in the ER where it showed up, possibly there. But in fact, we do not use gross beta at Mound.

MEMBER ZIEMER: Right. Very good.

DR. ULSH: So what is the status on the microfilm?

CHAIR BEACH: You tell us. Are you going to look for it?

DR. NETON: I feel like I'm missing something. Let's say we did find it. What would be the use? What would be done with it?

DR. ULSH: Well considering all that -- considering my take on it, the question that I asked Liz that the useful bioassay data was already pulled out and included in PORECON and PURECON.

DR. NETON: Right. So it would essentially be a verification that MJW did an adequate job pulling out the bioassay data. Is that correct?

MR. FITZGERALD: Well, it would also be a validation. I think what Liz was saying earlier is that what they retrieved from the Los Alamos records were in fact put on the microfilm and she was there when that processing was done and the comment was, you know, clearly, there is a record. There is a microfilm record.

I will defer to the workers. I mean, at this stage, it is a question and I don't disagree with Brant, it is a degree, a validation and if the work group is satisfied, it has sufficient validation based on the MJW record, plus Liz's comments. I mean, that is, you know, I think this is a judgment call as to how much validation does a work group need.

CHAIR BEACH: And do you have a comment, Kathy?

MS. ROBERTSON-DeMERS: Well, there is two sets of microfilm that we are talking about here. One of them is the microfilm that was sent to or that was created from documents that were sent to Nevada for burial. And I think one of the suggestions was to just go through that data because it is classified and see if there is any relevant monitoring data in it.

DR. NETON: Wait a minute. Wait a minute.

Where are these micro -- these

records are then.

MS. ROBERTSON-DeMERS: These are the records that we referred to as the DOE and I will refer to it --

DR. NETON: That is not --

MS. ROBERTSON-DeMERS: -- with respect to --

DR. NETON: -- a new record search, though. Those records exist and they can be looked at.

MS. ROBERTSON-DeMERS: And I think what we were recommending is that you go through the inventory and make sure that there is nothing --

DR. NETON: Well that is fine.

MS. ROBERTSON-DeMERS: -- nothing there.

DR. NETON: But what I was questioning is the value of going and trying to find microfilm records that Liz evaluated already.

MS. ROBERTSON-DeMERS: Okay, well

that is a second set of microfilm.

DR. NETON: Okay, that is what I am talking about.

MS. ROBERTSON-DeMERS: Okay, that set of microfilm is available at OSTI.

DR. NETON: Are you certain of that?

MS. ROBERTSON-DeMERS: That is what the records manager at Mound documented as far as how they progressed through the process.

DR. NETON: Okay and so if they are available at OSTI, what value would they provide if we went to get them.

MS. ROBERTSON-DeMERS: Now, these are classified again. Okay? And it might be beneficial to do a spot check on some of the personnel monitoring data to make sure that all of that classified data was captured.

DR. ULSH: But didn't MJW do that?

DR. NETON: MJW already did that. This would be QC check on MJW's work. That is what I am hearing. And we have a lot of

projects going on here and I am just trying to save resources where it is appropriate.

MR. ELLIOTT: If I may? This is Larry Elliott.

NIOSH has stated its position and we are going to stand by that. We don't have any reason to question the report from MJW. If the Working Group feels that it something they want to pursue, then I suggest you take it up with OSTI and pursue it in that regard.

Brant, you don't have any need to go back and look and validate further in this regard? Yes or no?

DR. ULSH: No, no.

MR. ELLIOTT: I mean, if you want to go there. But I am just saying, otherwise, we are done with that.

CHAIR BEACH: Okay, well I think at this time what I would like, just speaking for myself and the Working Group, is that we will wait for NIOSH's response to the white paper and go from there, if the rest of the working

group is in agreement. I mean, speak for yourselves.

MEMBER ZIEMER: That is why to get the official response from NIOSH. I already stated what I felt about --

CHAIR BEACH: Yes.

MEMBER ZIEMER: -- the MJW report. I think there is no reason not to accept that. I don't think that report is suspect at all.

MS. BRACKETT: This is Liz Brackett. I just wanted to say, you know, you are saying that you are accepting our review but I just wanted to make sure that everybody understands. You know, we were only looking for internal bioassay data.

MEMBER ZIEMER: Right.

MS. BRACKETT: So you know, we are not speaking as to the complete universe of what might have been included in those records. So that was clear.

CHAIR BEACH: That is a good point.

Thanks, Liz.

DR. NETON: I think -- good point. We can respond and put our position on the table when we evaluate the report.

CHAIR BEACH: Okay. And at this time, if there is nothing else, it is lunch time and we will reconvene, what do I have, about 20 to 1:00 or 20 to 2:00?

MR. KATZ: It is about 20 to 1:00 right now.

CHAIR BEACH: So, 20 to 2:00.

MR. KATZ: One hour, about 20 to 2:00. Thank you everyone on the phone.

MEMBER ZIEMER: Josie or Ted?

MR. KATZ: Yes.

MEMBER ZIEMER: Ziemer here. I may not be with you at that time. If not, I will certainly be back in the morning.

MR. KATZ: Okay. Thanks, Paul.

MEMBER ZIEMER: Okay. Bye-bye.

(Whereupon, at 12:38 p.m., a lunch recess was taken.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:41 p.m.)

MR. KATZ: This is Ted Katz with the Mound Working Group. We are reconvening after lunch. Welcome back.

Let me check on the phone to see whether we have Dr. Ziemer. Paul are you with us?

MS. ADAMS: Yes, Ted, we can hear you.

MR. KATZ: That is Nancy. I was just checking to see if Paul was with us.

CHAIR BEACH: He thought he wouldn't be with us.

MR. KATZ: Oh, that's right. That's right. This afternoon. That's right. Exactly.

Okay and by any chance, Bob, have you joined us? Bob Presley?

CHAIR BEACH: He said he would not

be with us.

MR. KATZ: Okay, he said that he, he sent me an email saying he might call in from time to time.

Okay, then otherwise, just to remind the folks on the phone, please keep your phones on mute, *6, if you don't have a mute button. And Josie?

CHAIR BEACH: Okay, we are going to shift gears just slightly and go into adequacy and completeness of external dose. And Joe, did you have a brief history on this also?

MR. FITZGERALD: Yes, just a little history on this thing.

This is the sort of the sister question of reliability to the internal dose discussion we had this morning. And again, I think it has been one of the charges that the Work Group and the Board has had and has asked SC&A to look at as reliability.

In terms of external dose, we certainly indicated that there was a

conclusion that the external dose was adequate and sufficient for dose reconstruction. So what we proceeded to do was a limited sampling, as we did with the internal. In this case, we felt that based on the interviews we had with the workers and the dose records, we felt that quite frankly, it was a fairly complete database on external but wanted to do the sampling just to again compare the electronic database with the originating documents that were on the file in terms of external exposure.

So, we did 22 cases and Ron Buchanan, who I think has spoke to the Work Group and you have heard from him last year on some of these same issues, I think what we can do is recap. We have already kind of briefed out this issue. But just to bring everybody up to speed and make sure we put the Work Group in a position to come to a conclusion of some sort, we are going to go ahead and walk through that one more time. So perhaps you an

talk about the sampling we did and some of the results. And also, I guess, there is a corollary issue on integrity. There are two issues pending now.

MR. BUCHANAN: Okay, this is Ron Buchanan and I followed up last year on some of the questions on the completeness and integrity of what the external dose data was. And what I found was that there was original handwritten data sheets which is what I wanted to go back to and compare them to the latest MESH database that the dose re-constructor actually uses. And the thing was if there was a limited amount of handwritten datasheets, there was only handwritten datasheets for the '50s and '60s and then there were some handwritten summaries through '68.

And so what I did, I have compared the original cards, handwritten summaries and the latest MESH database for 22 cases that I selected out of 698 claims. There was a total of 698 claims on Mound at the time; 447 of

those claims had starting dates of January of 1950 or later, in the '50s and '60s where I could find some original data sheets.

And 22 of these claims I selected, 20 were workers, process workers or whatever, technicians that could have had some dose. I did select two that were secretaries and something else that probably shouldn't have had any records. I wanted to check and see if the badging policy was consistent with what we thought it was. And so I went through about 4,000 pages of DOE records for these 22 claims. I found that 19 of them did have the summary data sheets, so there was three benchmarks that you could compare. There was about 530 years worth of total work history.

The result was that -- now this is a small sampling of claims but we just wanted to see if there was a problem or not and so that is the reason we did that, a small number. This represents five percent of the total claims that had data after 1950 and we

found that 100 percent of the claims had MESH data sheets in their DOE records. They had the original cards, photographs of original cards, photographs of the summary. And then also in the MESH database files were in their records sent them, to NIOSH by DOE.

We found that 100 percent of them had DOE records. Even the two that didn't weren't monitored. We found that 99.6 percent of the photon dose was correctly transferred from the cards to the MESH database and there was only one 20 millirem dose that was left off of the very early records. All the other records matched.

We found that 100 percent of the neutron dose was correctly transferred from the original cards to the MESH database. Now we did find the only area that we noticed a difference in was that while the original cards would have dashes or blanks in the MESH database, apparently goes in and puts in a zero if there is a dash or a blank in the

original card. And so there is a lot of zeros contained in the MESH database, which aren't on the original cards.

And so this might give the dose re-constructor the idea that the person was monitored when they weren't and the actual result was zero. And so that was the only real discrepancy we found.

As far as actual positive dose, the zeros, the recorded zero and the recorded positive dose were 100 percent accurate but there was zeros in the MESH database. Really, they weren't monitored during that period. And what this could lead to would be if the worker should have been assigned coworker dose or something, he was in a radiation area, if the dose re-constructor uses zero, he would be assigned a lower dose than if he would be usually assigned a coworker dose.

And also it could make the coworker database, if the coworker database was taken from the MESH database, it would make it

towards the low side, including the zeros.

So our conclusion was and realized we only did this, we only had to do this comparison for the '50s and '60s because there was no handwritten data after '68. And so the '70s and '80s we couldn't compare to see if it was transferred.

And you had your original handwritten datasheets. You had your handwritten summaries and then you had electronic systems up until you ended up with a MESH data system, which was the latest.

But this was kind of a snapshot, a spot check of the 40, 50 years worth of data transfer. And we did not see anything that would indicate a problem.

MR. FITZGERALD: I think the notion was if we had seen something that was pretty pronounced, we would have gone back to the workgroup and said, you know, we need to perhaps do additional sampling. But since the sampling came out pretty consistently solid, I

think that is where we are. That is where we have been on that issue.

CHAIR BEACH: I guess the only question I would raise is back on those zeros and would ask NIOSH to explain if that is in fact a concern.

DR. ULSH: I can take a crack at that.

I understand what you are saying, Ron, about this might lead a dose re-constructor to conclude that someone was monitored when in fact they were not monitored. And you said in that situation, that might lead the dose re-constructor to assign missed dose instead of coworker dose. Well, you are right. I mean, that is the way that we tend to do things. But a Mound, you have to understand we don't have an external coworker model because it is our position that if you had external exposure potential, you were monitored with one exception. And that is, for neutrons, people who went into the

facilities on what were called visitor badges, visitor meaning not -- it doesn't mean that someone wasn't a Mound worker. It means that they were not permanently assigned to that building.

For instance, in the early days in SM Building, we know that they did this. If you were a plumber or a pipe fitter, you know, called up to the SM building, for instance, it wasn't your permanent assigned building. You would be assigned, you could be assigned a visitor badge. So you would have a photon and a neutron visitor badge. And if, unless the photon badge gave above a certain reading, and I don't recall exactly what that was, they wouldn't read the neutron badge.

So that is one situation where you might have an unmonitored dose, and we are proposing, and as you know, from our conference call earlier, you know, like in the past month here, for our neutron dose reconstruction methodology, in that case, we

are proposing for the early years, a neutron coworker model to handle exactly that situation.

But that is not built from MESH data. That is built from the health physics progress reports. So you wouldn't have that kind of initiative.

For the other situations where you have a zero, for instance, at Mound what would happen is we would typically assign, because of our position, and this goes back to what workers have told us and what Meyer has said in his history of dosimetry that if you had the potential for external radiation exposures, you were monitored.

So, conversely, if you didn't have monitoring, that would indicate that you did not go into the radiation areas and we would assign environmental dose. So, what you are talking about is assigning a missed dose, instead of an environmental dose. And I would present to you that that is claimant favorable

because the missed dose that we assign is always far higher than the environmental dose, environmental external.

Don do you have any? Since you do the dose reconstruction --

MR. STEWART: That is right there. That is correct. The draft TBD that will be turned in soon for ADC review, actually brings out that exclusive point, that some of these zeros are artifacts of the record keeping system rather than actual zero dose results or less than LOD results.

We typically just leave those alone because we don't have any way to say that they are not actual instances of monitoring.

DR. ULSH: And it is claimant favorable to assign a missed dose.

MR. STEWART: And it is claimant favorable. We have discovered some years where we can recover doses by dosimeter, using the HP number and the TBD will include those years. Typically, we won't do that.

Typically, we will say he has got zeros in 1968, therefore, we will assume he was monitored for the whole year. Whereas, if that one item made that case compensable, we could go back and reconstruct the dose for 1968 and find out how many zero dosimeter results there were, if in fact there were any for that. You would have complete records for '68, '69 and a couple of years in '70s prior to the time when we have complete records in MESH.

But yes, we have one provision, one TIB that we can go back and in some cases, we cannot assign missed neutron dose. And that is TIB-23. This is a complex-wide TIB that is used. It was used to get rid of some of the, or to rule out, neutron doses in the face of many negative photon results because we were just assigning very high doses. Because Mound is not the only site that will have artifact zeros.

In fact, we don't apply that very

much at Mound because I mean, if you have got some instance of a positive neutron dose in the worker's history, you can't just simply say oh, well, he must not have been monitored all except for that one year. But typically, we don't apply that at Mound. It is possible to use that, if all the conditions are met from the TIB.

And that's it.

CHAIR BEACH: Anybody else have anything?

MEMBER CLAWSON: I was just trying to follow through. You said that you did this sampling up until the '60s. It was through the '50s?

MR. BUCHANAN: Yes, there was only the original ones that I could compare to during the '50s and '60s. The handwritten cards and summaries ended in '68. And so, from '69 forward there was no handwritten cards to compare them to.

MEMBER CLAWSON: So then you are

just going to the MESH?

MR. BUCHANAN: Well, I couldn't do any comparison. I could only compare '50s and '60s to the present MESH. I could not compare any data from say what was the '70s to MESH or '80s to MESH.

And I guess my contention was, first of all, that is all I had to compare it with. I couldn't do any other comparison. And if it did trace back faithfully to the 1950s, then it made it through all of the electronic database switches up through MESH.

You know, if a person in 1952 was assigned 100 millirem, then it was taken from the handwritten cards to the handwritten summary to the handwritten summary through the various electronic databases and correctly entered into MESH, then that would indicate that something over 40 or 50 years was correctly carried forward. But I did not have anything to validate that what was originally read in the '70s or '80s was correctly carried

to MESH. Because that was all entered in electronic form and then into MESH when that came about in what '88 or something like that.

MEMBER CLAWSON: Well, then we have a couple of electronic databases in there that this went to or did we --

MR. BUCHANAN: In between. In between '68, the last handwritten and MESH, there were several, I think at least one or two, in between the handwritten and MESH.

So when a person was read in 1970 and entered into that electronic database, then that had to be transferred to the next one in and on into MESH. But I have no way to even look at that because I don't have any original records, handwritten records from that era.

MEMBER CLAWSON: Didn't we take care of this a little bit earlier, just a spot check to make sure what was switched over?

MR. FITZGERALD: Well, we looked at the systems but this was sort of proof of

principle in going back and actually taking actual dosimetry records for individuals and just establishing that you could, in fact, confirm that they were complete, the transcription was correct.

And of course, this was a first order review and the premise was we would use this sort of as reconnaissance to see if anything would surface. Now, this was on top of having interviewed 40 some workers, of which I think you were on some of these interviews.

MEMBER CLAWSON: Right, I was.

MR. FITZGERALD: This was a straight forward questions. We asked every one of them in terms of the external badging and the completeness of that and how rigorous it was in RAD areas. And we got a pretty informed answer: it was pretty rigorous. And so this was to validate that the records, in fact, were likewise complete.

Could we do more? We certainly

could do more but based on this sampling, you know, that is, we feel that that pretty much gives us a confirmation, at least from that standpoint that that is complete.

MEMBER CLAWSON: Okay.

CHAIR BEACH: I guess as a Work Group, point of view, I would suggest that we close this item, officially close this item. And that is up for debate, discussion or anybody disagree with that.

DR. ULSH: So that is issue 18 and 19?

CHAIR BEACH: Eighteen and nineteen, external dosimetry records. So is that the path forward then? Does everybody agree with closing this?

MR. FITZGERALD: That doesn't include neutrons.

CHAIR BEACH: No. No, it does not include neutrons. Just this report.

MEMBER CLAWSON: But you are talking about that you were using the

environmental versus coworker because you didn't have coworker model. Right?

DR. ULSH: Right, we have not developed a coworker model.

MEMBER CLAWSON: Okay, so we are using the environmental for the workers?

MR. STEWART: For unmonitored individuals.

MEMBER CLAWSON: Unmonitored, okay.

DR. ULSH: And that hinges, Brad, that hinges on the position that if you went into a radiation area, you wore a dosimeter. So conversely, if you didn't wear a dosimeter, you were not in the radiation areas that we assigned as environmental.

MEMBER CLAWSON: Yes, and the reason I was bringing this us because the same with those interviews that we had that there was a lot of different talk about the environmental out there of different problems that they had out there.

MR. FITZGERALD: Yes, we raised

that in the environmental issue --

CHAIR BEACH: Twenty.

MR. FITZGERALD: -- which is later on this afternoon. And we in fact did convey not only the worker input but our own concerns to what extent those contamination events or instances, or whatever were considered in the environmental, occupational environmental dose.

MEMBER CLAWSON: Okay. That is all I wanted, to make sure we weren't losing focus on that. Thanks.

DR. ULSH: If I could ask, just for a point of clarification when we are excluding neutrons, I assume what we are talking about here is not necessarily the integrity of our neutron records but rather the methodology --

MR. FITZGERALD: Sorry, yes. Right. I'm glad you raised that because the context of how we carved out the neutron issue is exactly, that is not the integrity of the measurement so much as how the dose

reconstruction or estimation would be done, based on the neutron dosimetry. Yes.

CHAIR BEACH: Well, now, I don't want to, I want to make sure that we are clear on what we are actually closing and the original matrix item was 18, adequacy of the external dose records, and 19, integrity and completeness of external dose records.

MR. FITZGERALD: Right.

CHAIR BEACH: And that is it, at this point.

MR. FITZGERALD: Yes. The context, again, is this is something that is standard for the Board to review and investigate estimate support. And this was the approach that we brought to the Work Group which approved the approach when we did the sampling and these are the results. Now, the Work Group has the discretion to ask us to do more but this is as far as we have gone.

CHAIR BEACH: Well, barring any other discussion, I guess we will consider

that closed. Brad, are you comfortable with that?

MEMBER CLAWSON: Yes, I just wanted to make --

CHAIR BEACH: I know we don't have Bob and Paul to --

MEMBER CLAWSON: I just wanted to make sure that the environmental, --

CHAIR BEACH: Yes, we will get to that one.

MEMBER CLAWSON: -- that will be coming out later on.

CHAIR BEACH: Yes. Okay, silence.

Then that moves us to the next item for discussion and that would be item six, stable tritium compounds.

MR. ELLIOTT: But before you go there.

CHAIR BEACH: Yes?

MR. ELLIOTT: This is Larry. Could you state for the record how you close that out for me? How is it closed? Is it closed

because NIOSH did something. Is it closed because SC&A concedes the point or what?

CHAIR BEACH: I guess it is, in my terminology, and I don't know how to officially do that, it is closed because what we asked SC&A to do from a Work Group standpoint was to look at the work that NIOSH did and they concluded that there was no evidence that there was a problem with the external dose reconstruction. That is from my view.

MR. ELLIOTT: Thanks. That helps me understand how you see it closed.

MR. BUCHANAN: The external dose records.

CHAIR BEACH: Records. Thank you. Let me finish that comment. And we all agree with that so --

MR. FITZGERALD: Well, for clarification sake, it wasn't a contention so much because it is something that I think the Board has always asked SC&A to do is look at

the reliability of the data.

CHAIR BEACH: Correct.

MR. FITZGERALD: In this case, the sampling was the approach to do that. And that is it. You know, it wasn't disagreement on that.

CHAIR BEACH: Yes, and the only other thing we could do is ask you to do 20 more and see how that turns out.

MR. FITZGERALD: Well, I mean, there is different ways to skin a cat. But you know, given the feedback from the workers and given the review of the databases, I think we felt confident that with this sampling that we could come to this conclusion of an external database.

So, --

CHAIR BEACH: I agree. All right. Now, are we ready to move on?

MR. FITZGERALD: Yes.

CHAIR BEACH: All right. So, we are moving into issue six, stable tritium

compounds. And I believe, Joe, you are going to lead that discussion?

MR. FITZGERALD: Yes and carefully.

I have basically extracted pretty much the status from existing documents. I think, you know, we haven't really had a chance to articulate this issue in Work Group discussions before. So I want to go ahead at least for the benefit of everybody here and on the phone, just kind of walk through where we have been and where we are now and set it up from there.

So, I ask your forbearance. I am going to do a reading to make sure I don't get off track here.

"In its original evaluation report, NIOSH assumed that most of the tritium exposure at Mound was related to the uptake of tritiated water, HTO, which was effectively monitored with reliable dose assessments starting in 1957." This comes from the SC&A statement in the issues matrix.

"The prevailing internal dose TBD applies a correction factor to doses from MESH, so they will reflect the current NIOSH tritium dose assessment model. The ER states that the quantity and quality of available tritium urinalysis results are sufficient for estimating maximum dose or to alternatively, precisely estimate doses."

SC&A, in the SEC issues matrix, this was a response from last February, and this is our statement, the ER assumes tritium uptakes are from tritiated water and does not include a discussion on the potential for exposure to other tritium compounds. And what we are talking about essentially is tritides and organic tritium, two key examples. It further observes that there are no bioassay data from 1947 to '56, although tritium was handled during that period. So right from matrix.

Okay, in its July 5, 2008 response to the matrix, NIOSH indicates that as long as

records are available for tritium bioassay, doses can be bounded, regardless of the form of material, whether it is tritides, HTO, whatever.

It further notes that various Mound databases contain over 200,000 individual tritium bioassay records. And it also quotes Meyer. This is from the Meyer document, "That the program, the longest longevity at Mound is the tritium program."

Now, with respect to STCs, stable tritium compounds, NIOSH indicates that the technical basis document will be revised to include conditions for applying the stable tritium compound technical information bulletin, i.e., OTIB-0066, which applies OTIB-11.

A Working Group meeting held on July 14th of last year did not address this matrix issue but it was acknowledged in other discussions at how OTIB-0066 is to be applied. It is not to keep the not yet clearly defined

and this is going back a year. So that may have changed but that was kind of where we were at that point. And that "case-specific information suggesting potential exposure is not common."

A special technical meeting was held on this issue in a secure location on July 15, 2008 to address this issue. It was agreed by the Work Group members present, I think it was Brad, you were there, and Bob Presley, NIOSH and SC&A that a further roadmap review of STCs or stable tritium compounds was warranted, as well as a NIOSH demonstration of how dose estimation would actually be accomplished on an individual worker basis. And this would be based in part on a list of implementation questions that we provided at that meeting to Brant and the other participants.

And frankly, these stand as the, on this particular issue, as the outstanding Work Group requested actions on the issue. And

this dates back to that meeting.

Although STCs were not discussed at the Work Group's October 24th meeting, this was the last meeting, SC&A provided the advisory board at about the same time, a review of OTIB-0066. This is part of the procedures review and that was provided on November 25, 2008 that makes a series of findings and, as provided in excerpts, just a few bullets that were included in that review of OTIB-0066.

One comment was the types of STCs, the quantities handled, time periods of potential exposures, and the physical behavior of the tritium compounds in the environment must be known to effectively develop and apply OTIB-0066. A second comment was OTIB-0066 does not ensure that resultant doses are based on adequate monitoring data.

Although urinalysis, the basis for application of the models outlined in OTIB-0066, there is no guidance provided on the

interpretation of urinalysis results and its technical shortfalls. Effective methods for personnel and workplace monitoring were not implemented for STCs during Mound operations.

And a final bullet, again, from our comments in OTIB-0066, OTIB-0066 provides no guidance on how to distinguish between intakes of STCs, elemental tritium, and/or tritiated water, which occur simultaneously or overlap at Mound. In other words, you do have an environment where you do have all the above available for exposure and that is something that we feel is a limitation to what we understand is the implementation of OTIB-0066.

Among SC&A's recommendations was that characterization of the potential tritium exposure at a facility including SECs is critical to the application of models in OTIB-0066 and must be documented more fully. Claimant favorable assumptions can't be made in the absence of this information.

April of last month we issued a

white paper entitled response to modeling of intakes for special tritium compounds that more or less conveyed a lot of these same findings that were provided in the review of OTIB-0066 but perhaps was more specific to the Mound circumstances.

And additional considerations provided in that review include reference to a statement that individuals exposed to STCs can be identified through individual rosters and employees working in tritide areas at Mound. So, we did understand that, as Brandt has already indicated, that there is rosters of employees, I guess, 12 is the number you mentioned that apparently are available at Mound. So we did understand that and included it.

In terms of our bottom line at this point in time, and again, this is with the white paper submitted and everything, we think there is two critical SEC related questions that remain for the Work Group. One is

whether a boundary model can be developed with the compounds handled at Mound. And again, we have the issues that we stated for OTIB-0066. And two, if the necessary site-specific data are available to apply the model development.

If a bounding conceptual model can be developed for the first issue, then it would still be necessary for "proof of principle purposes" for NIOSH to demonstrate that its model can be applied to Mound workers with sufficient accuracy by indicating one, and this is in the white paper, to whom the model will be applied. And I think it sounds like there is some progress on that front. Two, how NIOSH will recognize exposures to special tritium compounds. And there is a number of compounds that certainly exist at Mound. It is one of the more complex sites. Three, how results below the minimum detectable concentrations will be handled for these compounds. Four, how they will differentiate bioassay results with tritiated

water versus organically bound tritium and special metal tritides. Five, what critical organs will be assumed for the different STCs that I just mentioned. Six, how NIOSH would be identifying exposures to stable tritium compounds in the absence of tritium bioassay data.

In this case, we are talking MESH has only tritium dose based on HTO prior to, I believe, September of '81. So the question is how would you certainly do this before then.

And then finally, what assumptions will be made in the absence of critical modeling data and parameters. And maybe one of the key ones, of course, is solubility of specific compounds, but there is other parameters as well. Certainly, one of them is particle size. I think we discussed that. That is one of the issues we discussed.

Finally, these, and we are calling these proof of principle issues, these proof of principle issues are not merely site

profile issues because, in our view, the validity of a proposed model as a dose reconstruction approach stands not only on the technical merits of its conceptual basis but also on the feasibility of how it is applied to site-specific circumstances.

On that basis, you know, we still don't view OTIB-0066 at this point as having been demonstrated as defining an upper bound with tritide doses at Mound. That is not to say it cannot be demonstrated but hasn't been demonstrated at this point, in our view.

So that is pretty much where we are and where we have been, well, I guess the last seven or eight months.

CHAIR BEACH: Are you ready?

DR. ULSH: I'm ready.

CHAIR BEACH: Thanks, Joe.

DR. ULSH: Well, not surprisingly, I guess, I do have a couple of thoughts on this. With regard to the special tritium compounds at Mound, you have to differentiate

based on the behavior in the body. I mean, obviously, we are all familiar with tritiated water, which tends to leave the body rather quickly and deliver pretty low doses.

Some of these special tritium compounds, in particular, the metal tritides, are less soluble than tritiated water, which means that they tend to stay in the lungs longer or the respiratory tract longer. And the most insoluble of these tritides can exhibit type S or even lower solubility but it is not infinite.

And we are certainly aware of what tritides are in use at Mound. We have compiled that information. As Joe said, we have to talk about this carefully because some of this information is sensitive. And I think it is also important to point out that a metal tritide is not necessarily a metal tritide, is not necessarily a metal tritide. In other words, there is differences between different types of metal tritides.

For the least soluble of the metal tritides, and this is where, I guess, my first point of difference with SC&A, in terms of I don't think it is necessarily critical to identify which metal tritides we are talking about. What is important is to identify the solubility behavior. I mean, if we want to call it tritide X, tritide Y, and tritide Z, as long as we are all understanding what the solubility that goes along with that, that is the important point for dose reconstruction.

Now, can we go to an appropriate location and talk about the exact identities? Sure, we can. And I suspect that some of you already know what they are anyway. But with regard to the least soluble of these tritides, it was a very small program. We have interviewed former workers who were directly involved with this issue at Mound and they have given us the list of names. So, Joe, it wasn't exactly a roster of people but it was the names of the people that were involved in

the program as provided to us by former workers. So, it is a list of the people who could have been exposed to this particular least soluble tritide.

And for those people, we proposed to do just like we do in any other situation where there are a number of possible solubility classes, and that is to add them to the mix. So let's say one of these -- I will just throw a dozen out there, although I can't swear that it is 12. It might be 13 or 10. I don't remember exactly.

If one of these people comes in as a claimant. And if they have a cancer in a respiratory tract or a lung, then we are going to apply tritides that would probably give you the most claimant favorable organ dose. For any other organ, it would not be the claimant favorable choice. And then there are a separate class of tritides that are less soluble than tritiated water, certainly, but they don't approach the insolubility of that

particular one.

For those, you know, of intermediate solubility, they had more wide-spread use. More widespread exposure potential, and we propose to do that, just like we do at any other site. That would be among the universe of potential forms of tritium that they could have been exposed to.

And it is important to note that, well, it is our position that if you could have been exposed to tritides, you were on tritium bioassay.

So, you might want to talk about that a little more but that is our position. So, if you have tritium bioassay, you can just model it with any of the applicable solubility classes.

Now with regard to that highly, the least soluble of the compounds, it is not like a situation where like, Brad, that you had talked about earlier where the crafts people could have jut wandered through the area and

been exposed. This was confirmed to us by several former workers. This program was very tightly controlled. It was performed in particular locations that were access controlled. You had to have a clearance to even get in the door. People did not just wander into this room. And it was cleaned up by the researchers who were actually doing the program. So for that particular compound, I don't think it is an issue that you could have just had roving people or anyone wandering by. That just did not happen. There was at least one incident of contamination but we know about that. We know who was involved with it and the exposures potentials are pretty low.

So, with regard to the seven questions that Joe laid out--and I think this is going to be the toughest nut for us all to crack here--it is our position that if we get to a point where a model can be developed and we could contend that a model has been developed in this OTIB-0066, then the question

becomes how do you implement it. And as I understand SC&A's position that under the sufficient accuracy guidelines, we would have to answer these seven questions. To whom a model would be applied, how you recognize exposure to special tritium compounds, et cetera.

Well, I would say that those are not SEC questions. Those are TBD questions. To whom the model will be applied? Well, that is an implementation question. And furthermore, I just stated how we are going to apply that model. For the intermediate solubility tritides, it is going to be everyone onsite could have been exposed to that material. So, that is the answer to that question.

MR. ELLIOTT: Everyone who was on a tritium bioassay program.

DR. ULSH: Correct. Correct. Sorry. Everyone who was on a tritium bioassay program, might have had that as a potential

form that they could have been exposed.

How we will handle the results below the minimum detectible concentration? The same way we handle it for every other bioassay result. There is nothing different here.

How we will differentiate bioassay results for tritiated water versus organically bound tritium special metal tritides, we won't. We will just treat that as one of the possibilities that they could have been exposed to.

What critical organs for different STCs? Well the critical organ is the lung and respiratory tract. Because that is why. They are less soluble than tritiated water, which means they don't leave the lungs as fast. For other organs, they deliver less dose than if it was tritiated water.

How we are going to identify exposures to STCs in the absence of tritium bioassay data. I would contend that you don't

have exposure to STCs in the absence of tritium bioassay data at Mound.

And what assumptions will be made in the absence of critical modeling data such as solubility? I am not aware of a situation like that. We know how to model with the least soluble compound. We know how to model the other compounds with standard ICRP models.

So, I don't see an SEC issue here. If we want to get into the individual compounds and where and when it was performed, we can do that in the appropriate setting, which is not today or here.

MS. ROBERTSON-DeMERS: Can I ask one question?

DR. MAURO: Brant, this is John. Is it okay for me to ask a couple of questions right now?

CHAIR BEACH: Sure, John, go ahead.

DR. MAURO: Yes, what I heard is something that I wasn't aware of is that tritiated water is the limiting form of

tritium for all organs except the lung.

DR. ULSH: Well, the lung and the respiratory tract.

DR. MAURO: Well, right. That is what I meant.

DR. ULSH: I would be careful there John. Basically, I am saying that those other organs in the body would be higher if you assumed tritiated water than if you assumed one of these metal tritides, for any organ except the lung and respiratory tract.

DR. MAURO: And that is true for organically bound tritium also?

DR. ULSH: I'm not sure.

DR. MAURO: Well no, the reason I raise the question is because if that is the case, it does -- I understand where you are going. Basically what you are saying is for all workers that you are going to do dose reconstructions for that have a cancer other than a respiratory tract cancer, you will simply assume the bioassay results that you

are looking at are based on exposure to inhaled tritiated water. But it sounds like maybe it is a little more complicated when you are dealing with organically bound tritium. It may not be that straight forward.

DR. NETON: But John, this is Jim, it doesn't really matter. I mean, we could run all possible scenarios and pick the highest dose. I mean, that is no different than we do for any S, W, S -- F, or Y type analysis.

DR. MAURO: I understand. Now, this case, the second question I have is if you were to, because of lack of knowledge or because you don't want to enter the world of classified information, you go with the most bounding assumptions. And let's assume that right now OTIB-0066 provides for that. That is, you know, in other words, whatever the limiting form is, you could assume that and place an upper bound on the dose to the respiratory tract or whatever organ it might

be of concern.

Now, it is my understanding that there is only a very, very small number amount of the tritium handled at these other facilities that were tritides or perhaps organically bound. The vast majority is the tritium handled at any of these facilities was tritium gas or tritiated water.

Now that brings me to my question. Is there a plausibility issue here. That is, would you be assigning to large numbers of workers doses that were not plausible, if you were to take that tact? That is, we will just default to the worst possible form of a tritide and assign that to all of the people where we have some question or there might be some question as to when and where and how much tritides you might have been exposed to.

Is that an issue that needs to be discussed -- a plausibility?

DR. ULSH: Well, I have some thoughts on that, John. First of all, I don't

think we are talking about large numbers of workers, because tritides would only turn out -- or organically bound, would only turn out to be an issue when you are talking about lung and respiratory tract cancers. So that it is a smaller subset of the claimants.

And furthermore, it would have to be of those people with lung and respiratory tract cancers, it would have to be someone who is not already compensated. And as you probably know, we already compensate three-quarters of those anyway.

DR. MAURO: Okay.

DR. ULSH: And then finally, for that remaining 25 percent of those particular types of cancers, would the doses be so high that it is implausible? I don't think so. They are going to be large, sure, but I don't think it is going to be implausibly large.

DR. NETON: And John, this is Jim, I agree with what Brant said. I also point out, you know, we do this all the time with M

and S.

DR. MAURO: Well, you know, with M and S, we very often are in a circumstance where there is a very real possibility that that is what you are dealing with. In other words, the uranium, I thought you were still talking uranium. Very often, you are not quite sure what the best form is and it is plausible that everyone might have been exposed to M or S.

In this circumstance, we know that everyone was not exposed to tritides. And that is where my question --

DR. NETON: I would disagree. If you take a uranium foundry and we are applying M and S in a foundry, chances are it is all S. But we will default to M to get the dose higher because it is possible that person was exposed.

DR. MAURO: Oh, okay. I guess I was under the -- you know, I am so used to the U-308 issue, it is sort of ambiguous.

DR. NETON: Right but think about it. I mean, we will default to M, even in a uranium foundry with oxides because it is possible that the person could have been working some other job location, some other situation. And I would argue that if it is implausible, we would assign a different dose.

DR. MAURO: No, I hear what you are saying. So you are saying -- well, you are saying that you do assign perhaps unrealistically high doses at uranium foundries by assuming M and S. You know, whatever is limiting. You have been doing the same thing here.

DR. NETON: I think if there is two plausible exposure scenarios and we can't pick between one because we lack information, we will pick the one that gives the higher dose.

DR. MAURO: So when you lack information about whether the person -- see, I guess in the situation like the metal foundry, you are saying that you will assign, even

though you are likely dealing with type S, you will assign an M if the person has a cancer that would give you a higher dose there.

DR. NETON: Absolutely.

DR. MAURO: Now, you would argue that the reason you are doing that is just to make sure that you don't underestimate the person's dose.

DR. NETON: Right.

DR. MAURO: But you know, someone could argue that well, is it possible that that person was in fact exposed to type M, even though it was a foundry. Were there activities going on there where there might have been M. I guess we haven't had this discussion before but if it is not plausible that the person was exposed, you know, we really, that is an issue, something that I think should be on the table as part of this discussion.

When the conservative assumptions that are applied get to the point where you

don't meet the plausibility requirements of Part 83, and I think that goes to the heart of well certainly not only the tritium tritide issue but even the matter you brought up before on the foundry.

DR. ULSH: Okay. John, I think if we were to come to you and say this least soluble of tritium compounds, we are going to apply that to everybody, even though it was only maybe a dozen people, we may have more of an issue to talk about here. But there are, as you know, there are a variety of tritides that were handled at Mound, other than that one. And by the way, that is why we are saying only that particular group of people has that entered as a possibility but for these intermediate solubility tritides, those were more widespread and I think there is more of a potential, especially during the D&D years, for instance, to be exposed to that.

Was the vast majority of the tritium handled at Mound HTO? Yes, sure. But

I think there is a reasonable possibility that people might have been exposed to these intermediate solubility tritides.

DR. MAURO: So you are saying that the approach you are taking may not be that implausible. That is, at any given time, the way Dr. Ziemer mentioned is that if you have a person and you are asking yourself the question, granted that collectively the exposures were to tritiated water but for any given person at a given point in time, you really don't know. Then it is plausible that he might have been exposed to one of the let's say the more insoluble tritiums.

Basically, I am taking your position right now. I am trying to find the virtue of your positioning. So what I am hearing you saying is that yes, even though collectively the total number of curies that I might have moved through as tritides is an extremely small fraction of the total amount of tritium that went through as tritiated

water. For any given person at any given point in time, one could argue that well, it is possible at that point in time for that particular sample, that is a result of an exposure to one of the less soluble forms of tritium and, therefore, it becomes plausible.

I just sort of like worked my through it to convince myself that your position is reasonable.

MR. ELLIOTT: John, this is Larry Elliott. If I were to answer your question I would say that we would be implausibly high if we were going to apply the highest insoluble tritide to everybody that was in the tritium bioassay program. That would be implausible because we know from the interviews and from the records that only 12 or so people were involved. That would be implausible to apply that to everybody in the bioassay.

DR. MAURO: Okay.

MR. ELLIOTT: But what we are saying here, we think it is plausible to apply

this dose for the immediate insoluble tritides because we feel that they were widespread and we can't place people in proximity to them.

DR. MAURO: That helps a lot. I didn't realize you were making almost like a three-tiered distinction.

Regarding the first tier, these 12 individuals, for those individuals is this something that goes behind the sensitive information window? In other words, when you picked those people and the reasons you picked those people, this is something that, is that information that has to be held as sensitive?

DR. ULSH: The reason that we picked them? Is that what you asked?

DR. MAURO: No, when you picked them. I guess you just picked them and said these are the people but the rationale for picking them and not someone else to be included in that group. I guess the way you get there, though, is true knowledge of sensitive information.

DR. ULSH: The rationale is the interviews that we conducted with former workers, that which has been provided to the Working Group.

DR. MAURO: So all of this can be discussed in an open setting. That is where I am headed.

DR. ULSH: Depending on what you mean by all of this, yes.

DR. MAURO: Well, I mean how you picked the 12 people and that yes, your justification for these 12 people being treated in one way as opposed to these other people being treated another way and the justification for making that distinction.

MR. FITZGERALD: The framework.

DR. ULSH: Yes. Yes, the supporting documentation has been provided. That is our interview notes. Of course there are Privacy Act considerations.

DR. MAURO: Oh, well, yes. When I meant sensitive I meant more by way of

classified information.

DR. ULSH: Yes, these were people who were involved in assessing doses from these particular compounds and, the people that we interviewed, and they provided a list of workers who were directly involved with this work. So that is --

MR. CHEW: You want me to talk a little bit about the program?

CHAIR BEACH: I think Kathy has been waiting to say something.

MR. FITZGERALD: Yes, we can switch gears and let Kathy and Bob comment as well.

MS. ROBERTSON-DeMERS: Okay, can I clarify something for you? The absence of tritium bioassay data, what we meant was the fact that only the dose data was available prior to September '81.

MR. SHARFI: Both the dose -- back to the actual urinalysis.

MS. ROBERTSON-DeMERS: Is that what you guys are doing?

MR. SHARFI: I'm sorry?

MS. ROBERTSON-DeMERS: Is that what you guys are doing, is taking that dose and converting it back to the urinalysis --

MR. STEWART: The dose re-constructors, no. We are simply assuming a very large MDA assigned missed dose.

DR. ULSH: Well that might be a PER that is coming. Keep in mind, Kathy, that the Mound TBD was one of the first ones that we did. And it predates OTIB-0066. So, that might be part of the reevaluation that we do when we go back and look at it.

MS. ROBERTSON-DeMERS: I have got a couple of other questions.

MR. FITZGERALD: Go ahead.

MS. ROBERTSON-DeMERS: How do you know that you have identified the most soluble form of tritide when there is such limited studies out there on solubility of these compounds?

MR. CHEW: It's insoluble.

MS. ROBERTSON-DeMERS: The insoluble. Sorry.

DR. ULSH: There have been direct studies of the particular compounds that were present at Mound and the solubility of those compounds.

MS. ROBERTSON-DeMERS: All 35?

MR. CHEW: Kathy, can I speak a little bit for the program, and recognizing a sensitivity, Kathy, I will just go over a little bit about the program itself.

There was a directive from the Department of Energy that asked Mound Laboratory to go ahead and try to find some metals that would be for tritides there would be an ability to store long-term for tritium. That was a real, we know that. Okay?

And so with this, Mound took that directive and there was quite a large fund to try everything. That is why the news came up and said well gee, it looks like as many as 40 or 50. Yes, they tried. Actually, they made

very small gram samples of those particular tritides. All right?

It really boils down to about 10 or 20 that we really focused in on. All this was done in a glove box operation. Let me just describe to you the process itself.

Actually, tritide is a small sample of this particular metal in a case like this would be and put it in a jar and basically had lines tied to it. And at a normal frequency, the basically open the stop cock to determine what the outgassing is. And if outgassing was high, then obviously it was not going to be good enough for the long-term storage. That was the term.

Well, believe it or not, a majority of the metal tritides are fairly soluble. They outgas very quickly. And the reason for that is that there is a radiation damage, believe it or not, from the data, in some of the metal itself. It just broke up the crystal structure. I actually had the chance

to even see that first-hand. We applied and we had a particular metal, we tritized it. It turned black. It turned black because of radiation energy immediately out there. So obviously, that is not good.

So from that standpoint, that is what the program is all about. Now, bear in mind when we come back to the story, these particular, especially the ones that were stable tritide, they were handled like particulars. Mound has a very good history of understanding how to handle particular glove boxes. This was a glove box operation. These were handling glove boxes.

So therefore, number one, the potential exposure was only due to the very fact that either a procedure or something went wrong with that particular experiment when they were doing it. And that is why it was limited to only a very few people handling the stable or the real stable tritides.

The stability of those tritides and

those particular compounds are still sensitive information because they would be of valuable information to the program itself. So bear in mind, that several times when there was a small particular incident of losing a few small amount of particulates of it, the swipe samples were taken if there was a particular incident and they were always asked the question about the person potentially walking into the room here. Brant has already expressed it, these were classified projects and those rooms were locked. They were type red, I think that is what the distinction was.

MR. SHARFI: Yes, they were key in lock. You can't just walk in there.

MR. CHEW: And because of the sensitivity.

So, I think to answer the question and John, for you, I think we can pretty much fully identify. We have the information from both the classified appendices to the document. We know which tritium compounds

were handled and in what particular room. And they have identified a particular period. And during the basis of the interview, we were able to clearly identify who specifically was handling of -- I think one specific stable isotope that was of primary concern.

DR. MAURO: Mel, this is John again.

MR. CHEW: Yes, sir?

DR. MAURO: The OTIB-0066 -- is Joyce Lipsztein still on the line? If she is not, we reviewed OTIB-0066 favorably. We only had one minor comment on a dose conversion factor for organically bound tritium. But Kathy has raised a question that I think goes to really to Joyce and that is, you know, based on our review and Joyce is pretty close to this issue working with ICRP, her finding when she reviewed the models developed, the generic models presented in OTIB-0066 for tritides, were favorable. That is, she felt that you know, given you had a measurement in

urine and given you knew what the person inhaled, what form he inhaled of the tritium, you could reconstruct the intake from the bioassay results.

However, Kathy, I think you raise an important question that maybe goes back to OTIB-0066. That is, are there, in other words, is OTIB-0066, when it was developed, did it capture, the, I would say, the most stable versions? If that is the case, then I think we are okay. I mean, we are okay with OTIB-0066, in terms of the model. But it sounds like there is some question and that is why I asked if Joyce was still on the line. There may be some forms that are even more stable than those that have been treated in OTIB-0066.

DR. BISTLINE: This is Bob Bistline. I would like to get into the discussion here.

DR. MAURO: Okay.

DR. BISTLINE: We had some

discussion with another site that also handled tritides and handled five different forms of tritides. And they tried to do some solubility studies and also some absorption studies and so forth. And the project got canceled and they said they couldn't. And these people are authorities on tritides. And they said that there is really no good information or very little information available on solubility and absorption capabilities. And they have handled and they handle it right now. And the question I raised was, was with regard to the absorption and the diffusion and reactivity of tritium with metals that they come in contact with and especially for long storage.

DR. NETON: Well, keep in mind tritium has a fairly short half-life.

DR. BISTLINE: Tritium has a short half-life.

DR. NETON: And so its solubility, it can be limited by its radiological half-

life.

DR. BISTLINE: It can. That's right.

DR. NETON: Well, it is.

DR. BISTLINE: It is. It is.

DR. NETON: It does not have a solubility class that is longer than it's what ten-year half-life?

DM. CHEW: 12.226 years.

DR. NETON: So therefore by definition, the worst case solubility of tritium is 12 years.

DR. MAURO: Yes, that is true. Is that what you want, by the way, approximately, when you are at your upper bound for --

DR. NETON: I don't know. I would guess if you looked at S, class S, it probably is somewhere -- I don't know.

DR. MAURO: Okay, but I hear where you are going with that.

DR. NETON: Where I am going is there is a practical limits of the dose that

tritides can deliver.

DR. BISTLINE: Yes, I agree on that. But you know, we had a tritium issue at Rocky.

DR. NETON: Yes, it is somewhere between 12 years and a lot less than 12 years. But it can be bound.

DR. BISTLINE: But if you bound it with 12 years, then I can agree.

CHAIR BEACH: Well back to John's comment on OTIB-0066, I thought there were six findings and I guess I am not clear on where John is saying there wasn't any findings or issues with OTIB-0066. So, --

MR. FITZGERALD: Well there were findings on the application of OTIB-0066.

DR. MAURO: You know what? I am sorry. I didn't want to mislead anyone. Our generic findings on OTIB-0066 were that it was favorable.

MR. FITZGERALD: The conceptual model was favorable.

DR. MAURO: -- we did comment.

CHAIR BEACH: It said the model was but there were still issues with how --

DR. MAURO: Exactly, there were issues with implementation.

CHAIR BEACH: How it was going to be applied.

DR. MAURO: Exactly. Exactly.

MEMBER ZIEMER: This is Ziemer. Can I make a comment?

CHAIR BEACH: Sure, Paul.

MEMBER ZIEMER: I think I mentioned this before but perhaps worth repeating. Many of these things that we call tritium compounds are not true compounds. They are tritium absorbed on something. Tritium tritide is an example. It is mainly absorbed in the metal matrix. So the tritium outgasses is almost constantly at any temperature, certainly more at elevated temperatures, but the solubility issue, in my mind, becomes a little bit confused when we are thinking about it as the

solubility of a metal compounds.

I don't know if John Mauro if any of your folks can clarify. Are you talking in terms of the metal compounds as a compound? Solubility of a metal?

DR. MAURO: When we reviewed OTIB-0066, there were certain biokinetics of the clearance from the lung. And there was an upper bound value for the most soluble form, the least soluble form of tritium. And as I recall, it had to do with the breakdown of the particle itself in the lung. Eventually, the particle begins to break down and the tritium leaves for the most stable form of his tritides. Now, there is probably, I believe there was a continuum though of the kind of thing you just described. There are other forms where the tritium more readily leaves the metal matrix. But the most --

MEMBER ZIEMER: Yes, using a matrix is not really bound like a Q compound, I think.

DR. MAURO: Yes, I tell you I did not look into it from that respect; in other words, what was the chemistry of the way in which the tritium was bound. I think it was more of an empirical issue. That is, the ICRP folks looked at it and so did Joyce. It really had to do with the clearance, the rate at which it was cleared.

MEMBER ZIEMER: Right. Regardless of how it came off. Right.

DR. MAURO: Yes, but how it -- exactly.

MEMBER ZIEMER: Yes, okay, I am with you.

MR. CHEW: Paul, this is Mel. You are absolutely correct. When you actually have to make a metal to have the tritium pulled onto, you need to have to do it in like a vacuum deposition. Okay? That is an example of how you would actually make a tritium target for an accelerator. That is for the example where it really holds on.

But you are right, these are the tritium compounds which will continue to outgas. As a matter of fact, when we discussed it with the workers, they said when you actually saw it exposed to any moisture or any air, even some of the more stable ones that they thought would have an initial outgas.

MEMBER ZIEMER: Yes, in fact, I think the tritium continuously exchanges with the hydrogen in the air in some of these.

MR. CHEW: That is correct.

MEMBER ZIEMER: Yes.

MR. KATZ: Kathy?

MS. ROBERTSON-DeMERS: I just have one comment and that is that Joyce was not privy to all of the information, obviously, on tritides when she did that analysis. And that is why we followed up with a Mound specific report.

DR. ULSH: Well, okay but to answer your earlier question Kathy, how do we know

the solubility of all of the metal tritides --

Go ahead, Mel. You probably would do a better job than I would.

MR. SHARFI: When we wrote the Mound STP TBD, we specifically had inherent knowledge of what they worked with and what were the metals that disassociated their tritium sloped. So, we were I guess privy to information to specifically target our modeling based on the material we worked with at Mound.

Now, I mean, if you get outside Mound I'm sure other sites may have done other work but our target for developing the Mound metal tritide TBD was specific for the material and inside knowledge of what we worked with. And I probably can't go too much more into that knowledge but so we had a very clear knowledge of which metals would result in some of the longer tritium retention and that is where we specified our work into.

MS. ROBERTSON-DeMERS: And how did

you know that?

MR. SHARFI: That would be -- that is getting into that classified -- the people that actually worked that material, it was designed for particular needs. And those people who designed that material would know which holds tritium longer or shorter.

DR. ULSH: But I think you are talking past each other. You are saying you know what tritides were present at Mound. And Kathy is asking how do you know that there is not one of those tritides that is less soluble than the one we are talking about?

MR. SHARFI: Well, they made them. I mean, there is a purpose to them. It is not that they just randomly had these --

MR. FITZGERALD: Well, there is two issues, too. I think Mel explained earlier that you had lab or bench top concentration or activity levels -- and you had maybe a dozen, ten that might have been in a greater quantity. So you have two gradations. You

know, one is the solubility question and one is whether it was a tiny lab amount versus something that was being pursued further. So you know, there is different variables in there.

One thing that concerned me early on in this thing and again, I think this wasn't addressed in the ER. So just in terms of context, we just raised it as an obvious issue which you are familiar with but it wasn't treated for good reasons. But OTIB-0066, as of last year, we asked Stu Hinnefeld this question, you know. What is the history of its application at the time? He said it never had been applied. It hadn't been used in dose reconstruction. I was wondering if you know that has changed or not.

DR. NETON: I don't think so. I think it has not been applied, to my knowledge. Mound would certainly be the place for it to be applied. There is other sites.

MR. SHARFI: -- I don't much about

the Mound --

MR. FITZGERALD: Yes, well, this first came up at Savannah River as a question, tritides and at that time, I think OTIB-0066 was still in the wings in all discussion and everything.

MR. ELLIOTT: But we have been consistent in saying that it is a site profile implementation issue and their site profiles have to be revised to address that.

MR. ELLIOTT: We haven't done that yet.

MR. FITZGERALD: Yes, I am not even going there. I am just saying OTIB-0066 as a means to model this.

DR. NETON: Yes, I am not sure why that is important, though. I mean, is OTIB-0066 a valid means of assessing tritide dose. That is, I think, the question. Whether we apply it or not is kind of --

MR. FITZGERALD: Well, I guess the question it goes to though is --

DR. NETON: -- it's not irrelevant, but --

MR. FITZGERALD: -- whether, you know, again, we raised the implementation issues in both the comments on 0066 as well as in this context is, you know, there is just no application that one can look at as a proof of principle. And I think that --

DR. NETON: Well, wait, wait. This is a very simple TIB. And basically, I am looking at it right now.

MR. FITZGERALD: Right.

DR. NETON: It assigns the least soluble tritide compound to Type S. It says it is no slower or it does not go any faster than S.

MR. FITZGERALD: But Jim, the question that has driven this from last year is whether or not the specific data and you know, certainly what we are hearing today is the first time that, although we have had some hints, I guess earlier. But you know, the

first time we are actually hearing, okay, certain parameters who, you know, the three tiers, the who part might be answered. You can actually identify. That wasn't clear last year.

DR. NETON: Okay.

MR. FITZGERALD: The compounds in terms of being able to envelope the important compounds and of course, the question of importance is something that I think is being, I think has been sorted out to some extent.

DR. NETON: Right.

MR. FITZGERALD: And how one is going to, as an approach, distinguish between the different forms of STCs, I think I have heard that, too.

These are all parametric questions about whether or not OTIB-0066 would have the key ingredients to demonstrate. And when I raised the question last year saying, you know, these are very basic parameters. But if there is just no implementation of the model

and no guidance as to what the pieces are going to be, there was no --

DR. NETON: I don't see this any different than Super S at Rocky Flats, to be honest with you. We developed a model that was defined, it was examined by SC&A and it clearly said it will bound intakes for Super S material. And that is what we proposed here.

CHAIR BEACH: Doesn't the Work Group need to validate site specific data with sufficient accuracy using --

DR. NETON: Which site specific data are we talking about?

CHAIR BEACH: -- using OTIB-006?

DR. NETON: But the site specific data is we would apply either very insoluble or moderately soluble. We picked the most claimant favorable solubility class.

MR. FITZGERALD: But let me walk back because I think the analogy is a useful one, because we did get into OTIB-0049 and the validation, I think Joyce did a lot of work on

that, really focused on the autopsy data and showing that 0049 in fact was an upper bound for real cases. I mean, they are real cases pulled from various sites.

In fact, I think as I recall, there was a fairly upper bound case from Rocky, upper bound case with Hanford, and this whole thing, I think, came down to hinging on the fact that when you looked at the curve, there is no question that that factor of four, I think it was, was going to envelope the highest cases.

And I think that was the proof of principle in the sense that not only was there a good model but that model was validated against real data. I think in this case what we are saying is that we are in the same place of saying, okay, the equivalent of the OTIB-0049 model is OTIB-0066. There is a model.

DR. NETON: Right.

MR. FITZGERALD: And we have looked at the model and conceptually, I think,

actually Joyce has spent some time with it and it, too, looks pretty good. But the second step that she took on OTIB-0049 which would be the equivalent here, is saying okay, you know, when you actually apply it to real cases, is it going to demonstrate an upper bound or not.

And I think when I asked the question last year has anyone used it, frankly, I wanted to cut to the quick and say well if you have applied it, then we can at least look at how the data was, the Mound-specific information was applied and we gained some confidence that not only did the concept hold true, technically, but the application of that concept to Mound data.

Now, if some of that data, if you could not have found -- of the workers who were throwing their hands up and saying, you know, we don't know who those people are. I mean, you know, we could take a guess but we really don't know that. And I would say that is kind of a challenge to the model because

you might have a model but you know, I mean, there is just the parameters that feed that model may not be available.

And so the proof of principle is can you actually identify the workers, identify the compounds, you know, so forth and so on.

DR. ULSH: So let me ask you this. If we came to the Working Group and SC&A and laid sample dose reconstructions that used OTIB-0066, would that address your concerns?

MR. FITZGERALD: Well, I think that would be the proof of principle. Again, we don't have anything other than the concept, the model that seems to be conservative. What you are saying is encouraging because I think the pieces that would go into that model are available but you know, we haven't actually seen it demonstrated.

CHAIR BEACH: We would have to see it demonstrated.

MR. FITZGERALD: And the difference

with OTIB-0049 I think that really made the difference is not just the concept but when we actually saw the curve over the autopsy cases, that was the, to me that was the final word. I mean, there was no question that even in the worst cases, the estimation was going to be much more conservative. An upper bound was demonstrated on those.

DR. NETON: Well, we didn't make these numbers up, Joe. I mean, this is based on literature searches. I mean, the references are in here.

But I think you are right. We can certainly produce the --

MR. FITZGERALD: But what is the equivalent? I mean, I don't disagree.

DR. NETON: Well, I think we found the equivalent.

MR. FITZGERALD: What is the equivalent for OTIB-0049?

DR. NETON: We don't have autopsy data for --

MR. FITZGERALD: Well, I know. I know but what would be the equivalency, the analogy to being able to show that this model would constitute an upper bound if you had the sufficient data?

DR. NETON: Well, I think the equivalency is to demonstrate that these compounds, the compounds that we have applied here that are based on documented literature search information adequately bound. And apparently, SC&A originally agreed that that was okay because this model was not -- this was a generic model to apply to special compounds of tritium. And we heard nothing back from SC&A saying that these weren't sufficiently bound.

DR. MAURO: Jim, that is true but I guess the information we are hearing now is that there might be --

DR. NETON: Well, but see now --

DR. MAURO: -- maybe the chemical forms or the forms of the tritium --

MR. FITZGERALD: We raised these same issues on our comments on 0066. I am not quite sure that --

DR. MAURO: -- work toward our knowledge of tritiated compounds based on our knowledge and from working with ICRP investigation into this matter. It sounds like you folks got a lot more sophisticated. There are a lot more forms of tritium that are in play here and there may be forms that are more limiting.

But Jim, you had mentioned that in the end, if you go with just the radiological half-life and the clearance rate for the lungs, that places an upper bound certainly on the lung dose. And as I understand it, for any other organ, the limiting form would always be tritiated water.

MR. FITZGERALD: John? John, can I intercede?

DR. MAURO: Yes, sure.

MR. FITZGERALD: We have, all

along, since Savannah River, in fact when we first raised this issue as a part of the site profile review at Savannah River, had raised these very same issues and recognized that it is a generic issue, have expressed the same concerns every time tritides have come up.

DR. NETON: But that was before OTIB-0066 was written, Joe. Savannah River site profile --

MR. FITZGERALD: But we provided comments on OTIB-0066 last year.

DR. NETON: I don't recall OTIB-0066 saying it was not sufficiently conservative. I don't recall that comment at all.

MS. ROBERTSON-DeMERS: There were several questions in OTIB -- several findings in OTIB-0066 related to the orientation of the --

CHAIR BEACH: I guess that is one of the things that I was going to bring up.

DR. NETON: Okay, well, so is this

an --

MR. FITZGERALD: Well, I don't want make it an OTIB-0066 meeting but we did comment on these issues.

DR. NETON: Yes, is this an OTIB-0066 issue or is this a Mound issue, I guess?

CHAIR BEACH: Well, both of them come to play in my mind because OTIB-0066 --

MR. FITZGERALD: I don't think you can separate it. I think it is a generic and a site specific. I think there is an overlap, quite frankly.

DR. NETON: Sure.

CHAIR BEACH: OTIB-0066 is being used here but we had a -- or SC&A's comments have never been talked about or reviewed by NIOSH. So that was part of one of my comments is to request NIOSH to address SC&A's comments to OTIB-0066.

MR. FITZGERALD: Yes, actually when we were asking for any data on, or any results from the application of OTIB-0066, we are

talking about DOE-wide or complex-wide, mainly because I think we were just interested in how the model would be applied, not even Mound specific.

CHAIR BEACH: Right.

MR. FITZGERALD: And so I think there is an overlap here.

DR. BISTLINE: Okay. So, there are site returns, people have worked for the site returns had potential.

MS. ROBERTSON-DeMERS: In addition, HT and HTO diffuse into material, which is where you get the problems in D&D.

DR. ULSH: Right and that is why we are going to apply those intermediate solubility tritides to pretty much everybody to handle those kinds of situations.

So given the answers that I have provided today to these seven questions and if we commit to providing you with sample dose reconstruction that implements OTIB-0066, providing that those things are done, are we

done on this?

CHAIR BEACH: What about addressing the review of OTIB-0066 to start with? Because that has never been addressed. And I would assume this would be the right format to do that.

DR. ULSH: As I understand it, the review of OTIB-0066, the comments that SC&A had dealt with implementation. Correct? And --

DR. MAURO: Brant, that is my understanding, too. The last time I read the review and the issues resolution process that we went through at the procedures Work Group, there was a clear boundary between implementation issues and what we would call biokinetic modeling issues which are generic.

DR. ULSH: Okay. And the only biokinetic modeling issue, as I recall, that we had a concern with had to do with organically bound tritium and the clearance rate.

And you folks agreed that there needed to be a correction made. And so we closed out all the issues and transferred basically the issues that were site specific regarding implementation. They were important. Don't get me wrong. But from the procedures Work Group perspective, those matters were appropriately dealt with on a site-by-site basis on how you were going to implement it at that site.

So, OTIB-066 -- my understanding is OTIB-066 issues from the Procedures Work Group perspective in the biokinetic realm, have all been resolved. And the only issues remaining is how are you going to implement it at each of the different sites. And this is an important discussion we are having because I think the strategy that you just described, Brad, does address the implementation issues. And the question is, does it address it to the satisfaction of the Work Group?

But I don't think it bounces back

to the Procedures Work Group. I think those issues have been resolved.

CHAIR BEACH: And I think Kathy has a comment.

MS. ROBERTSON-DeMERS: I would recommend that you have them respond to our white paper on tritium compounds --

CHAIR BEACH: Yes, I haven't gotten there yet.

MS. ROBERTSON-DeMERS: -- instead of OTIB-0066.

DR. NETON: Well, wait a second.

DR. MAURO: I agree.

CHAIR BEACH: Well, we were just talking about OTIB-0066. I hadn't asked about this yet. I agree with you, Kathy.

DR. NETON: Well, let me see if I understand because I think we are talking about the same things in different terminology.

I mean, what I am hearing is that the solubility of the tritide compounds has

not been called into question that has been used in OTIB-0066. There were some issues of organically bound tritium but the implementation doesn't mean are there more insoluble types of tritides than S out there in the complex.

Because if that is an issue, then we have got --

MR. FITZGERALD: I think that discussion has to be somewhere else. I think there are, you know, I think that is something we had planned for a while but we haven't had it yet.

MS. ROBERTSON-DeMERS: And please be aware that the person doing the analysis on the models was not cleared and did not have --

DR. MAURO: That is correct, Kathy. You know, I think that you just hit the nail on the head. The issue on is it possible that there were some chemical forms at particular sites which are not captured, are not bounding by the upper bound assumptions used in OTIB-

0066. And whether you want to call that a generic issue or a site-specific issue, I mean, that is certainly something that needs to be addressed. And I don't know, you know, and this is a question I think is before NIOSH and the Work Group. And I think NIOSH needs to address that.

That is, when you pick this bounding approach for these 12 individuals or 13, are you saying that you are going to use the limiting exposure pathway that is adopted in OTIB-0066 or perhaps something more limiting that goes beyond -- more conservative than OTIB-0066?

DR. ULSH: So is SC&A saying that there is something less soluble than that one particular compound that we know of?

MR. FITZGERALD: No. What we are basically saying is that, and I purposely identified the discussion we had last year, because we have unfinished business which, you know, Mel, I think you were part of this, we

were going to come back and just kind of confirm some of the questions I think Mutty started getting into it a little bit that would give us confidence that in fact that is the case.

So we are not saying we have specific evidence. We are saying we have never, I think closed out that question that was raised in our meeting last summer, which was to have this second session which would put this to bed. And I think we still need to have that but we have already talked about this. But again, that is where I think it stands right now.

CHAIR BEACH: And does anybody mind if we just go ahead and take a break?

We are into an hour and a half and then we will resume this conversation at 3:15, unless you guys want to keep going.

Do you think you will lose the thread?

(Laughter.)

CHAIR BEACH: I don't think we will lose it. I just think it is break time.

MR. KATZ: 3:15.

MR. CHEW: I don't know if we can close it right now, Brant. I think in the discussion that we are going to probably have, you know, we obviously have identified all, we have identified all of the compounds and the metal tritides here. So you want us to look at that making sure that --

MR. FITZGERALD: Yes, that was the action, was to go and --

MR. CHEW: -- the one that we -- there was none more that we identified that was more stable than the one that --

MR. FITZGERALD: That was the question from last year and you were going to go off and do that and come back and we just never came back.

MS. ROBERTSON-DeMERS: Right. And provide a reference on how we determine that stability.

MR. CHEW: It would be classified.

MR. KATZ: And that with that, we are going to take a ten minute break.

MEMBER ZIEMER: Ted, I will be gone after the break.

MR. KATZ: Okay. Thanks, Paul.

(Whereupon, the foregoing meeting when off the record at 3:05 p.m. and resumed at 3:19 p.m.)

MR. KATZ: Okay, so this is the Mound Working Group and we have just, we are just coming off of a break. And we had lots of discussion about tritium compounds and I am not sure if we are moving forward to the next issue.

CHAIR BEACH: No, we are still on tritium. Is there any more discussion before I kind of summarize where I think we are?

MR. FITZGERALD: Let's hear the summary first.

(Laughter.)

CHAIR BEACH: Well, I am just going

to give a real small summary. Other than what I have already asked for, I would like to see a written response to SC&A's white paper from NIOSH. And I would also like to move that we schedule a secure meeting to discuss a couple of the issues that were brought up at the last secure meeting that have never been dealt with. I believe Joe touched on them earlier. The roadmap, and then demonstrate how some of this is going to all be accomplished.

MR. KATZ: I think we need more discussion about that. In terms of there was some discussion about proof of principle or whatever. I don't think that needs to be done in a secure setting. Is that right, Brant? I mean, you can do some dose reconstructions as examples without --

DR. ULSH: Well, it depends on how you define proof of principle. We can certainly provide sample dose reconstructions.

CHAIR BEACH: But I think we would like to have SC&A provide some --

MR. FITZGERALD: Well, I think we need discussion. I feel uneasy about having an open discussion about designing a proof of principle. Because I think, for example, some of the 12 individuals I would like to know what they did, who they are, and maybe they would be part of this ER. But you know, that would have to be done, I think, in a secure location.

I am just saying, I think we need to know at least what the functions, what work they did, and maybe choose one of those as a sample dose reconstruction.

MR. FITZGERALD: Joe, I would like to add when you do discuss this matter, I would be very interested in knowing whether the limiting path exposure that is in OTIB-0066 is in fact bounding for all forms of the stable tritides that are at Mound. Or do you believe that you are going to have to with the more limiting?

MR. FITZGERALD: Well, I think has

to go toward sort of demonstrating upper bound, which --

DR. MAURO: Yes.

MR. FITZGERALD: -- at this point, money has raised some interest on my part to understand better what was done at Mound when he was there. And I think the basis for that information and also some better knowledge of the 12 individuals and maybe from that design what this test, I don't know if you would call it a test, proof of principle looked like.

I think it should be aimed toward an upper bound. Not simply just dropping numbers into an OTIB-066 model because I think what we are trying to get to is, yes, as with OTIB-0049, you know, we can take some of the least soluble and design it so that it gives you pretty good assurance that that would represent an upper bound.

DR. MAURO: The only reason I say that is if it turns out that OTIB-0066 does in fact, in its limiting case, bound all

circumstances for Mound, well, that would mean that you could just, you know, default OTIB-0066 as being the limiting pathway or, if it turns out no, there were circumstances that were unique at Mound and OTIB-0066 really doesn't place an upper bound, we need to know that.

DR. ULSH: I can already answer that.

DR. MAURO: You can?

DR. ULSH: Yes. The tritides that were present at Mound are covered by OTIB-0066. They are listed by name in there.

DR. MAURO: Okay and the most limiting form in OTIB-0066 does bound Mound?

DR. ULSH: The most limiting form listed in OTIB-0066 is hafnium tritide and there is nothing at Mound that is less soluble than that.

DR. MAURO: You have answered my question. Thank you.

DR. ULSH: You're welcome.

MR. ELLIOTT: We will further answer this question in the documentation we provide in response to the white paper. And we will give you example dose reconstructions but we are not going to give names. We are not going -- of the 12 people, we are not going to identify particulars about those 12 people.

The sensitivity about their work, if you want to understand that, you can do that in a secure briefing situation but we are not going to come to the table with a proof of principle that looks like one of the claimants from that 12.

MR. FITZGERALD: Not but we can certainly pick parameters or characteristics that would be realistic but not traceable to an individual, which would be helpful. Because we don't know, you know, the information I think you have garnered in terms of this roster is something we have not seen. I think it would be useful to see it.

DR. ULSH: I think you have seen it. It was in the interview notes that we did with the three workers, I won't say the names but --

MR. FITZGERALD: We will take a review but I would suspect those have been screened.

Well, I think we can discuss this further. We don't have to settle it at the table but I think we need to --

MR. KATZ: Well, I just wanted to be clear about the secure meeting. If you want to go to a secure meeting to confirm that, for example, that their model is capturing the least soluble factor, for example, that sort of thing, to make this kind of confirmations, I think that is fine. There is no problem with that. I just don't want this closed meeting to be a debate about methods itself because those should happen in public here.

CHAIR BEACH: Right.

MR. FITZGERALD: Yes, I don't think we are talking methods. I think we are talking about confirming.

MR. KATZ: Right but for confirming things, I think that is fine. That is what I just want to make clear.

MR. FITZGERALD: And as I would think input to perhaps settling on a couple of scenarios to test out using OTIB-0066, I think that would be the only other purpose I could think of.

CHAIR BEACH: Well and then to take a look at the addendum to the roadmap.

MR. FITZGERALD: Well, the roadmap. The addendum to the roadmap.

CHAIR BEACH: Yes.

MR. FITZGERALD: Right. Those would be sort of three nexuses.

CHAIR BEACH: Okay? You just have that look, Brant.

DR. ULSH: You are in charge.

CHAIR BEACH: No, that is all I

have. And then I guess we can discuss that time period at some other point.

MR. FITZGERALD: Well, yes, I think that has been an open discussion as far as having that next session.

CHAIR BEACH: Anybody else, any comments or --

MR. LaBONE: This is Tom LaBone.

CHAIR BEACH: Hi, Tom.

MR. LaBONE: How are you doing?

CHAIR BEACH: Good.

MR. LaBONE: Could I make a few points about OTIB-0066?

CHAIR BEACH: Sure.

MR. LaBONE: Do we have enough time to do that?

CHAIR BEACH: Sure.

MR. LaBONE: Okay because I think it would help focus any further discussion that you have.

I wrote OTIB-0066 and in it there are three models for tritium compounds. There

are the tritides, organically bound tritium, and the tritiated water. And there are standard ICRP models for those three types of compounds and that is what OTIB-0066 uses. There is no OTIB-0066 model in the same sense that there is an OTIB-0049 model, kind of thing.

And really all OTIB-0066 tried to show was that for those compounds, if you take a look at what comes out in the urine that you could use in existing OTIB, an existing methodology, which is OTIB-0011 to analyze the urine data and come up with a reasonable dose.

And I think that if you go through and you know -- SC&A had some comments that I need to address -- but in principle if you are calculating a dose to a systemic organ like a prostate or a liver and you have enough urine samples, say you have a urine sample every week, I don't need to know what the material was, if it is one of those three compounds.

So, the whole discussion about

solubility is moot if it is a cancer of a systemic organ. Where it becomes really important what the solubility is, is if you are talking about a respiratory tract cancer or possibly GI tract. I don't know. Just something where it is not in the systemic body.

MR. FITZGERALD: Didn't you say, though, that would be, by and large, the greater number? I don't know. Is that something that was mentioned, that the respiratory tract would be more implicated greater than systemic?

DR. NETON: Yes, the more insoluble, the higher the respiratory tract dose.

MR. LaBONE: Well, it is just if you are working on a dose reconstruction that involves a systemic organ --

MR. FITZGERALD: Right.

MR. LaBONE: -- then, the solubility, I don't know need to know any.

MR. FITZGERALD: Yes.

MR. LaBONE: And the person had an adequate number of urine samples, I don't need to go hunting for what was the material and what was its solubility.

MR. FITZGERALD: Right.

MR. LaBONE: And that is all I was trying to point out. So when you sit down to discuss, it is a, it kind of focuses the issue in on it is of importance for respiratory tract cancers. It is not a broad, across-the-board issue for every dose reconstruction.

And I don't think there is any vigorous disagreement with that. But again, just listening to the discussion, it helps to narrow it down. It is a smaller problem or a smaller issue than if it applied to everybody. So that is really all I wanted to make the comment on then.

MR. KATZ: Thank you, Tom.

CHAIR BEACH: Okay, if we are finished with the tritides, we will move on.

The next agenda item is Price-Anderson related bioassay issues number 21. And I believe, Joe, you were going to take the lead on this one.

MR. FITZGERALD: Yes, this is one we have been working iteratively, I think going back and forth with NIOSH doing reviews as well as we. And it involved a concern that was raised about actinium-227 urine bioassay samples that were collected. You know, in 1991, this is the Price-Anderson Act enforcement issue that I think certainly most people at Mound were familiar with. And it raised a number of questions about the validity of bioassay and whether or not the way that was handled was reflective of how the bioassay program was being implemented at Mound, just you know, at that time frame as well as historically.

And back in July, NIOSH presented a white paper on the subject that pretty much itemized a brief description of each of the

three DOE enforcement actions relevant to dosimetry details. Mound's response to the enforcement action is what they did and any SEC implications and provided a pretty detailed chronology of actinium-227 problems as well.

So, in terms of the NIOSH and SC&A actions, we focused on essentially the 20 RWPs that the Work Group wanted us to disposition from the standpoint of what the implications were for the adequacy of bioassay and whether or not that would surface an SEC issue, in terms of the validity of bioassays.

And without going through a detailed chronology, I know the time is going to get a little tight, where we came out, each of the 24 relevant Price-Anderson related RWP issues were dispositioned by both NIOSH and SC&A. And the only exception, we had five items from our listing, and this is in the white paper that we provided NIOSH and the Work Group back last month. We only had five

items left and they essentially went back to this question of data adequacy which we address in Issue 11.

So some of these issues get back to the adequacy of urinalyses for actinium, rather than other implications. So, we have kind of handed it off as part of the overall, and it is mentioned in the Issue 11 white paper. But we ended up feeling that there weren't any SEC issues that came out of that detailed dispositioning of the RWP issues.

We did have three questions, really, that remained beyond the question of the SEC implications we felt were important ones to address. The first is how will dose reconstruction be completed for individuals who entered under RWPs without appropriate tritium bioassay and did not submit a post-job tritium bioassay sample in a timely manner.

And the second one was, and these are all hows, how will dose reconstruction be completed for individuals who entered under

RWPs without appropriate Pu, thorium, uranium, radium, actinium, or americium bioassay samples that did not have a follow-up sample to those discovered in '95.

And finally, the third question that was pretty much what was left from this review, how will dose reconstruction be completed for the 11 individuals who submitted actinium bioassay samples that did not have a follow-up sample to those discovered in 95.

So really those are clarifying questions. You know, again, I think we agree with the conclusions that NIOSH reached on its review of the RWPs. And we agree that we don't see any obvious SEC implications from those RWPs but we do have those three questions.

And that is pretty much where we ended up and that is kind of abbreviated. There was a long history on this one and we spent a lot of time, as did NIOSH, going through all these RWPs and looking at the

history of the enforcement actions. So, it is a pretty detailed analysis.

DR. ULSH: All right. Gene Potter, are you on the line?

MR. POTTER: Yes, Gene Potter, ORAU Team. No conflicts with Mound.

DR. ULSH: All right. Gene is the guy on our team who pretty much handled the investigation of these Price-Anderson Act issues. So Gene, do you want to respond?

MR. POTTER: You know, I don't think that I can, you know -- since we haven't coordinated on this, I don't think I can respond directly to how dose reconstructions can be done but I have looked up some additional data, if you would like me to present that.

DR. ULSH: Sure.

MR. POTTER: On the first question which related to no tritium bioassay follow-ups by some people within 30 days of their last entry on the RWP, there were seven RWPs

involving tritium. They were called out in the follow-up to the Price-Anderson.

And if you look at, and SC&A observed that there were 38 to 67 percent of the individuals who did not submit a sample within 30 days. If you look at the individual RWPs, you find that for the first one -- three people submitted within 30 days out of three workers. The second one with 64 out of 105; 24 out of 46; eight out of 13; two out of four; one out of three; three out of eight. For the total number of entries, worker entries was 105 within 30 days out of 182 total worker entries. So we are literally dealing with a glass half full, glass half empty type argument.

And of course, NIOSH does not do DRs RWP by RWP. But if I were an internal dosimetrist and looking at data, I would say I certainly could bound the doses for those individual RWPs.

MR. FITZGERALD: That would be a

coworker, basically?

MR. POTTER: Well, no. I am not suggesting that this actually be done, unless you know, Liz wants to choke me or something. I am just saying that there are lots of, you know, you can look at this as there is lots of tritium data missing or you can look at it as there is lots of tritium here that was collected.

In addition, the picture might actually be a little bit better than what this data shows and others that, you know, I don't want to put anyone on the spot, but others there may be able to make a comment on this, that in the end, in the modern era at Mound, how the RWP program worked was that workers were only sampled on a period basis, not at necessarily after every entry on the RWP.

So for instance, a person may be going from tritium RWP to tritium RWP and only receiving a tritium sample at some point when the database was queried. And so this would

fall more into a chronic-like scenario that NIOSH is likely to use in reconstructing these doses. I should, you know, comment that I am not a qualified dose reconstructor on Mound but that is my assumption.

If we looked at the second question, which basically involved people not getting follow-up bioassays on plutonium, thorium, uranium, radium, and actinium in some cases, and americium, there were 14 RWPs that involved plutonium. Let's just take a look at plutonium, for example, instead of running through all of those which would be quite time-consuming.

I did a similar sort of thing only I looked at bioassays for plutonium submitted within 90 days, which is probably a more reasonable thing since plutonium is more insoluble. And if I looked at the first four, I won't run through all of the numbers for you, but if I looked at the first four, where we were successful or the data showed that

Mound was successful, three out of three times for the first RWP; seven out of nine times; eight out of 11 times; and one out three times for 90 days but it would be two out of three if you fudged it to 91 days.

Overall, there were 77 samples successfully submitted within 90 days out of a possible 101 last entries. So, I should mention that the average for submitting samples was somewhat over 50 days, depending on how you calculate it.

In addition to the comments I made earlier about whether a person could have possibly been sampled on a periodic basis and not necessarily when they made the last entry to a specific RWP, this analysis that I did and was presented in the data before cutoff at the end of 1997, so we extended the picture into 1998 for plutonium, which as I mentioned is more insoluble, the picture would probably be better than stated.

The third question was the actinium

samples for 11 individuals. And this is from the 2001 Price-Anderson enforcement action for the August of 2000 discovery of 15 unanalyzed samples. Later it was determined four of the 15 had submitted samples. So that leaves you with 11. We were unsuccessful in finding any record of who the 11 people were by name but by doing database queries, we found a list of 14 individuals who met the specific criteria. So I personally, I should say, I don't speak for NIOSH, but I personally feel that the list of 11 is likely to be included in this 14 and therefore, this should not be an SEC issue. We know who these folks are.

And again, I don't want to comment on how specific dose reconstructions may be done but that is the results of the additional data search that I did.

MR. FITZGERALD: Okay. And what did you search on? What were your search parameters? I mean, how did you find these 14?

MR. POTTER: Oh.

MR. FITZGERALD: Time frame and location?

MR. POTTER: I think it is described in the paper that you reviewed. Let me see if I can find it quickly so I don't make an error relying on my memory here.

I believe it is described on page 10 of 16.

MR. FITZGERALD: Okay. Well, don't take the time. I mean, we will go back but I am just curious.

MR. POTTER: Basically if I could describe it in generalities, folks were not sampled within a certain time period and had not submitted a follow-up sample. So you know, that is sort of the way I did it.

DR. ULSH: So kind of like the other issues that we have discussed that SC&A has issued white papers on, I would propose that we respond to their white papers.

CHAIR BEACH: That is what I wrote

down.

DR. ULSH: I thought you probably did.

MS. ROBERTSON-DeMERS: This is Kathy. Can I make a clarification?

CHAIR BEACH: Sure.

MS. ROBERTSON-DeMERS: I think the bigger question on number two is if the individual went in on an RWP and then never submitted the sample after he made that entry, versus submitting it within 90 days. So maybe he left Mound before submitting a follow-up.

DR. ULSH: So are you saying then that we might have used --

MS. ROBERTSON-DeMERS: Now, the question is directed at that type of a person.

DR. ULSH: No, I understand.

MR. FITZGERALD: Well, if that person existed.

DR. ULSH: Sure. We used the criteria or Gene used the criteria of 90 days but I guess maybe it was 100 days or 180 days.

That guy is probably not of concern. It is the guy that never gave one that you are worried about.

MS. ROBERTSON-DeMERS: Right.

DR. ULSH: Okay.

Now, I don't think that that is a Mound-specific issue. It is an issue anywhere that, I mean, I think that the sites did the best that they could to get exit bioassay samples from people. But there is always a chance that someone could --

MR. SHARFI: They thought that they won't give a termination sample, there is nothing a site can do.

CHAIR BEACH: That comes up in some of our D&D time period also. Yes, okay. Anything else on 21? Any comments from the Work Group?

Are we ready to move on to -- I didn't ask. What is the end time for people? I mean I don't want to hold people past when they normally stay at work.

DR. NETON: About 9:00.

(Laughter.)

CHAIR BEACH: Oh, so we can clearly get through the next couple of items? Is that agreeable? Yes? I want to know at least what time they want to leave.

MR. KATZ: Let's give it a shot.

CHAIR BEACH: Give it a shot. Okay.

So, let's move on to shallow dose issue number 16, once again led by SC&A. And I think Joe is also handling that one.

MR. FITZGERALD: That one I am going to defer to Ron. We had a technical call a couple, two or three weeks ago and I don't know if we talked about shallow but did we? Okay, so this -- why don't you just give a summary of where this came from.

MR. LEWIS: Joe, I don't mean to interrupt but this is Greg Lewis. I just wanted to let you know that DOE is on the call. We joined a little late but I just wanted to make sure everyone knows we are

available, maybe not for direct questions but if there are things come up on this call that you need addressed, we can make sure to get the answers for you and let you know. Thanks, everybody.

MR. FITZGERALD: Thanks, Greg.

CHAIR BEACH: Great.

MR. BUCHANAN: Okay, this is Ron Buchanan with SC&A. And the shallow dose was brought up several times and we wanted to kind of bring this up to date and what needs to be done with this, at this point.

Shallow dose, of course, just a quick review, is defined as a non-penetrating dose, which is the low energy gammas, betas that would come from a low-energy emitter. And at Mound, one of the complicating issues was that initially they had beta radiation, and then they didn't have any for quite a while, and then they had some later on.

And so that led to two problems when we analyzed the records from Mound was

that 1) that led to a large gap in beta dosimetry period just because they didn't effect any. So there wasn't any reading of the open window. In the dosimetry if they took the open window minus the shielded window, that was the shallow dose but that wasn't done a lot of the times because they didn't expect any dose. There was kind of an informal directive that if they had seen some darkening of the window, they would read it. There wasn't any real hard and fast policy though.

And since they did not expect much shallow dose, they did not calibrate for it. And so there was no real calibration for shallow dose until the 1979 area. And then it really didn't get DOE Lab accredited until about 89, 88-89 period. And so this was after TLDs had been in for ten years or so.

And so what SC&A did was bring up the fact that whether this is really an SEC issue that has not been identified but we did

want to bring up this issue and see where it stood. And so we presented these three factors, the lack of monitoring, the lack of calibration, and three, DOE accreditation.

And so this led to two action items from NIOSH. Last fall, they provided us with a list of 108 shallow dose cases that I went through and will present a short summary on and then they also brought it in March of 09, a review of the Mound shallow dose prior to 1991.

And so I would like to summarize where we are at on those. And so last fall from these 108 cases, I went through an analyzed 18 of these cases that were shallow-dose cases and determined how many of them had any recorded shallow dose. And of the 18 that I selected, randomly from the workers description, they might have them. I didn't select like secretaries or administrators, but technicians and stuff that might have some shallow dose. I found four of the 18 had some

record of shallow dose and that these were years without any adjustment factors when the dose reconstruction was done. And usually it was the number right out of the dose of record. So there was no adjustment made to them.

And so, then I went and reviewed the NIOSH's white paper in response to these issues and found that essentially what NIOSH proposed was recognizing that there was no monitoring and perhaps sometimes should have been monitoring for shallow dose. They came up with essentially a summary table on page 10 of their white paper, table four, which they went back and looked back at the workers that might be exposed, had the potential for exposure to shallow dose and have to assign a shallow dose and what they did was used a shallow dose to photon dose ratio. So, if the worker was monitored for photon dose, then they would assign a factor of anywhere from one to four as a shallow dose. And this was,

depending on the year and location that the worker worked.

And so I went through and analyzed this and SC&A does not have any SEC issues with their proposed white paper but where we do stand on it is we felt two issues. Number one, we felt that it was incomplete for the latter years because they started calibration in 79 and started using TLDs in the 70s. And but they didn't get lab accreditation, no lab accreditation until 88-89. And so we would like to see what adjustments need to be made to the dose of record for shallow dose or for shallow dose as a function of photon dose during the TLD area of 10 DOE accreditation. We felt that the white paper was incomplete in that area. That is number one.

Number two is that we feel that although the correction factors given for the previous time frame are agreeable, we don't know it is complete until we see it actually implemented in the TBD.

MR. STEWART: Just to update you on that, the external TBD for the Mound site is currently under review. And right now, it has a due date to ADC review of June 6th. So, and I am writing it and I also wrote this. So, this is in there.

MR. BUCHANAN: The dose charts, the tables and such are in there.

MR. STEWART: Yes. Yes, this will go in there and not as a piece of whole cloth, but where appropriate, sections are broken out in this table.

CHAIR BEACH: So do we put your name on the action item then, Don?

MR. FITZGERALD: It's going to go there anyway.

CHAIR BEACH: Just kidding. Okay.

MR. KATZ: Thanks for volunteering.

MR. STEWART: Actually, probably the best way to measure implementation is simply to review the draft when it comes out.

CHAIR BEACH: So SC&A to review the

draft.

MR. STEWART: Once approved. Once we reach the right level of approval, then turn it to SC&A.

CHAIR BEACH: Right, right. And then the only other question from the Work Group is that NIOSH would answer SC&A's concerns in their white paper, responding to your earlier white paper.

MR. FITZGERALD: If he is going to do a white paper, I mean we gave the original feedback.

MR. BUCHANAN: Yes, we gave the feedback to the white paper.

MR. FITZGERALD: Yes.

CHAIR BEACH: Back in April, yes, but we have never had an answer to it, I don't believe. Did we? Or is that --

MR. KATZ: It sounds like this is the answer.

CHAIR BEACH: This is the answer to it. Oh, okay.

MR. BUCHANAN: Well, there has not been a direct answer to our --

MR. STEWART: In terms of your comments one and two, no. I can address comment two because we are implementing this program in the TBD. That was -- we are doing that.

CHAIR BEACH: Right.

MR. STEWART: I haven't addressed comment one yet.

MR. BUCHANAN: Okay. And there are site profile issues addressed in our reply that wouldn't be SEC issues.

MR. FITZGERALD: They are identified as such. So you know, we label them that way and understood that, you know, the SEC review process as site profile issues are identified, we hand them off but we don't pursue them until the next edition of the site profile.

CHAIR BEACH: Right.

DR. ULSH: So really there is only

one outstanding question and that is what adjustments need to be made to the dose of record between 79 and 89.

CHAIR BEACH: Yes.

DR. ULSH: So, I will address that question.

CHAIR BEACH: Okay. Are we ready to move on, then? Yes, okay. The last to pick today is the environmental issue number 20 and SC&A is going to lead that.

MR. FITZGERALD: Yes, this was a secondary issue that we included in the site profile. And what I mean by secondary is that with the Price-Anderson, we had some clarifying questions we wanted to raise but certainly didn't feel there was a complete basis to identify it as a full SEC issue. So, it was on the cusp. And the reason we raised it was a comment or a statement in the ER that Mound did not generally experience significant site-wide ambient contamination and there was less concern about the potential for internal

dose related to ambient working conditions.

And this, I think, Brad, you were raising some questions about site contamination, historic site contamination events. And we had a number of workers that raised issues like that. And so our question was, you know, you are going to apply an ambient value. To what extent does the ambient value reflect this history, relatively rich history? We have offered some examples but the response was I think you all felt these were more examples of localized contamination that would not impinge on this ambient value that would be applied for the site, site-wide. And we sort of got into this discussion about the statement itself. I think there was even an offer at some point during the discussion just to consider removing the statement.

I think our concern is just the statement more than anything else, that there were sources of contamination at Mound and it

wasn't clear how that would be included in the ambient calculation. I think the response was there would be a maximum ambient value applied. And I thought that was a reasonable clarification but, Brad, you may want to -- this was the issue you raised earlier that we raised in that context.

MEMBER CLAWSON: Well, you know, I was just trying to see where you were going with the outside because I guess from some of the interviews that we have had and so forth like that, they have brought up concerns with that.

I guess one of the issues that they had brought up was that it was totally there was a coal-fired plant that was down the road that was supposedly spreading all of this contamination at the site and that it had been taken away, that actually it was coming from the site.

Then getting back to, I know we don't want to talk about the microfiche but I

thought also too on that microfiche that we should have talked about it earlier. Part of the thing that came out on that was that they actually had stacked results were coming out of that and that they had ambient information of what had actually gone out of the stack and so forth like that.

And I was just wondering, how are we going to do the ambient exposure, I guess you could say, or the outside exposure. And this covers all areas of it because it covers the D&D era and then it also covered the earlier years of what people were getting, especially out of the stacks and so forth like that. And I just had some questions of how we were going to do that.

DR. ULSH: Well, keep in mind that Mound, like other sites, issued environmental monitoring reports that talked about -- I mean, they had a variety of samplers around the site. And I think that we would propose to use that data the same way we do at other

sites for ambient environmental. And that typically includes taking the maximum possible exposure at the site based on the monitoring results and applying that, certainly, to unmonitored individuals. Especially at Mound, in light of what I said earlier, where the position is that if you were not monitored, that is where we would assign an ambient environmental dose.

Jim was correct. We got into a bit of a discussion about that statement from the ER. I recall that discussion, too. I couldn't find it in the record anywhere but I know we had it because I remember it just like we did. And SC&A took some exception to our statement that they didn't have site-wide ambient contamination widespread. I think some of that may be a bit of semantics. When we talk about site-wide, what do we really mean?

Mound certainly had contamination incidents, one of which I think was cited by

SC&A and that was the contamination at the canal near Mound by the plutonium spill. And our response was that well that contaminated the sediments in a canal and workers were mucking around in that periodically. And when we are talking about ambient site-wide contamination, this is walking-around dose. This is what you get just walking from building to building or from your car to the gatehouse.

And there were a few other examples I think that you all presented. Contaminated equipment turning up where it wasn't supposed to be, that kind of thing. And I think we took issue with that. We said that those really aren't examples of ambient site-wide contaminations but this, I think, is more of semantic discussion. We would propose to do environmental doses at Mound, just like we would do anywhere else.

MR. FITZGERALD: Yes, the bottom line is you would take the maximum monitoring

value for a given year -- you do it by year, right?

DR. ULSH: Yes.

MR. FITZGERALD: And you would assign that as the ambient, the maximum ambient, which I think is where we came out, finally. I mean, that is one reason it was listed as a secondary because we had a question about the statement and wanted to clarify exactly what that meant. We interpreted it perhaps the wrong way and I think what we heard was this was how it was going to be done. And I think that was fine but it took a lot to get there. It was fine by the time we did figure out what that statement meant.

DR. ULSH: Well, given that we had the same recollection on that --

MR. FITZGERALD: Yes.

DR. ULSH: -- what is the opinion about whether or not this is an open SEC issue?

CHAIR BEACH: Kathy has got her hand up real quick.

MS. ROBERTSON-DeMERS: Can I ask a question?

MR. STEWART: Yes.

MS. ROBERTSON-DeMERS: How far back do you have the environmental reports?

MR. STEWART: Raw data-wise, they started reporting soil and water measurements in the very early days, in the 40s.

DR. ULSH: I think the actual official ambient -- I'm sorry. The official environmental monitoring reports, the 70s or 80s, it seems. That was, I think, the reporting vehicle for those.

MS. ROBERTSON-DeMERS: And a different question. How far back do you have the reports, the environmental reports available to you?

DR. ULSH: I would have to look back in the record for that, Kathy. I don't really know exactly.

MR. STEWART: I don't know either. I did not write in the TBD.

DR. NETON: But the TBD is covered, I am quite sure in some way.

DR. ULSH: Yes.

DR. NETON: There is a whole section on ambient environmental.

MR. STEWART: Yes, have you looked at the references in the TBD?

MS. ROBERTSON-DeMERS: That was -- not yet.

MR. STEWART: Okay.

DR. ULSH: Well, that TBD was written a number of years ago but I would encourage you to not just assume that, if it is not listed in the TBD, we don't have it because there has been a lot of data capture between then and now.

MR. FITZGERALD: Going back to Brant's original comment, that was lifted into this sphere as a question but you know was sort of listed as a demarcation after 19. And

somehow the demarcation kind of got lost in the shuffle. But certainly 20 and 21 were considered clarifying issues that were included to get a response, as opposed to helping them as big SEC issues. And somehow they got lost in the shuffle but I think we are satisfied on the environmental side.

CHAIR BEACH: So I am hearing that SC&A is satisfied as long as NIOSH agrees to remove that statement or change that statement. How did that go?

MR. FITZGERALD: Well, I think we understand what the statement means. We didn't at the time when we saw it in the ER.

CHAIR BEACH: But it doesn't necessarily have to be removed.

MR. FITZGERALD: I don't think so. I think we understand what the meaning of the sentence is, or the statement is.

DR. ULSH: Yes, we are on record with this discussion.

MR. FITZGERALD: Yes, I didn't mean

for it to balloon.

CHAIR BEACH: That was an April discussion, I believe.

MR. FITZGERALD: Right. Right,, right. We have had this discussion but I think that would take care of it. I would propose that the Working Group close it.

CHAIR BEACH: Okay and I understand that. How does the Working Group feel about closing that item?

MEMBER CLAWSON: I don't really see a problem but I do have one question and it keeps coming back to this. So we are actually redoing the whole TBD or we are reevaluating the TBD?

MR. STEWART: Currently under revision is the external TBD and that will be done soon. And that is one of the six sections.

We will also need to necessarily review the revised internal section, incorporate the proposed for tritium and the

other radionuclides that we talked about today.

MEMBER CLAWSON: And the reason I am bringing this up is because we evaluated this earlier TBD and now we are seeing things that are changed. Well, we don't know what is changed.

DR. ULSH: Yes, you are right, Brad. I mean, this was one of the earliest site profiles that we wrote. It was, I think, one of the earliest ones that SC&A reviewed and they issued comments on it.

MEMBER CLAWSON: Right.

DR. ULSH: We are picking that TBD up again. We are going to be considering a number of things; SC&A comments on the first TBD, the additional information and discussion that has come up as part of this SEC process. So, I am trying to capture all of that into a sensible revision TBD.

MEMBER CLAWSON: Okay and my question was Joe, are we going to follow up on

the changes that are made to those?

MR. FITZGERALD: Well, yes.

MEMBER CLAWSON: You know, we are closing these issues but I just wanted to see how they play out into the TBD.

MR. FITZGERALD: Well, there is two avenues post-SEC. One of course is that the Advisory Board can always task us with redoing the next revision. And that has already happened in a couple of locations where a new edition of the site profile comes out and the Advisory Board tasks us with reviewing and seeing what has changed and providing comments.

The other is something I think Mark Griffon has raised in the past, which is sort of these site profile issues that come out of an SEC discussion, but there isn't either a work group or there isn't a revision of the site profile. And that is a little tougher issue.

MEMBER CLAWSON: Okay, and that is

kind of --

MR. FITZGERALD: That is not the case here.

MEMBER CLAWSON: Right.

MR. FITZGERALD: It sounds like we are actually going to have this picked up in a new edition.

MEMBER CLAWSON: And this is why I was bringing this up because I have been working with Mark on some of these issues and so forth.

MR. FITZGERALD: Right.

MEMBER CLAWSON: I just wanted to make sure that by closing these that, you know, we just see how they are reincorporated.

MR. FITZGERALD: This works but I do agree that the other venue is a little harder because we don't have that easy ability to tackle it.

MEMBER CLAWSON: I appreciate that.

DR. MAURO: This is John. Procedurally, if the Work Group is an SEC/Site

Profile Work Group the way I believe Hanford and Fernald is, though you have resolved, let's say, certain issues in terms of, oh, this is not an SEC issue, it is a site profile issue, then and that work group is active, well that just continues and we continue to meet and work on those issues.

However, we have had circumstances where we have commented on the site profile and the site profile has been reissued and let's say a year passes, we would not automatically review that document unless the Work Group asked us to review it. In other words, once we have submitted our comments on a site profile and then the site profile is reissued, perhaps it does and perhaps it does not, we would not automatically take any action unless the Board or the Work Group asks us to do that.

MR. KATZ: Thanks, John. And this Work Group, I mean, the Board can task, too. It doesn't have to be a work group. The Board

can task a re-review of a site profile that has been substantially changed. This Work Group is specific to the SEC.

CHAIR BEACH: That's right.

MR. KATZ: It is not a site profile work group. And of course, the Board can also convert this work group to a site profile work group, if it so chooses.

MEMBER CLAWSON: Well, and I think we have kind of learned some things through the years. We really don't close out the site profile until after the SEC --

DR. NETON: Well, yes, the matrix would remain. You know, all of the site profile issues will remain open. And then Ted is right. The Board could reconvene this working group or form another working group to close out the site profile.

MEMBER CLAWSON: Okay, I just wanted to make sure.

CHAIR BEACH: Well, we were just wondering if that was more of a formality than

anything else.

DR. NETON: What had happened before was occasionally, there would be working groups that were already site profile working groups and then an SEC petition would come onboard and then it would convert, but that is not the case here.

CHAIR BEACH: Okay, so at the recommendation of SC&A, the Work Group recommends that we close Issue 20, which was never actually viewed as an SEC issue, I believe it was a secondary, with acceptance of NIOSH's practice of a maximum value being derived for Mound's occupational environmental ambient dose.

Does that cover it? Is everybody comfortable with that? Do we close two today?

DR. NETON: Just for everybody's information, I pulled up the Mound environmental site profile and it turns out that I think the official environmental reports only go back to 71. And what we did

was use, I think, effluent data when we had stack effluent emissions the delta chi over q values and picked the highest receptor point on site for those earlier years going all the way back. The official environmental reports were not available in the very early years.

MR. CHEW: Can we get a late start on day two?

CHAIR BEACH: No.

MR. CHEW: I'm teasing. I'm only teasing.

CHAIR BEACH: No. No, no, no.

I guess that would conclude our work for today, if everybody is in agreement.

MR. KATZ: Thanks, everybody, for all of the hard work.

CHAIR BEACH: Yes, thank you.

MR. KATZ: And folks on the line, thanks.

(Whereupon, the above-entitled matter was concluded at 4:08 p.m.)