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

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ADVISORY BOARD ON RADIATION AND WORKER HEALTH

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WORK GROUP ON FERNALD SITE PROFILE AND SPECIAL EXPOSURE COHORT (SEC) PETITION

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MONDAY,
SEPTEMBER 15, 2008

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The Work Group meeting convened telephonically at 10:00 a.m. Bradley P. Clawson, Work Group Chair, presiding.

MEMBERS PRESENT:

BRADLEY P. CLAWSON, Chair
MARK GRIFFON
ROBERT W. PRESLEY
PHILLIP SCHOFIELD
PAUL L. ZIEMER

ALSO PRESENT:

NANCY ADAMS, NIOSH Contractor
SANDRA BALDRIDGE, Petitioner
MELTON CHEW, ORAU
HARRY CHMELYNSKI, SC&A
ZEDA E. HOMOKI-TITUS, HHS
EMILY HOWELL, HHS
TED KATZ, Designated Federal Official
ARJUN MAKHIJANI, SC&A
JOHN MAURO, SC&A
ROBERT MORRIS, ORAU
EUGENE POTTER, ORAU
BRYCE RICH, ORAU
MARK ROLFES, OCAS
MUTTY SHARFI, ORAU

T-A-B-L-E O-F C-O-N-T-E-N-T-S

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

10:02 a.m.

MR. KATZ: I'm going to start with roll call and then I have a couple of administrative things to say and then it will be all you, Brad.

CHAIR CLAWSON: Okay. Sounds good.

ROLL CALL

MR. KATZ: So for roll call, first myself, this is Ted Katz, and I am the Designated Federal Official and Executive Secretary to the Advisory Board of Radiation Worker Health and this is a meeting of the Fernald Work Group of that Advisory Board.

And now if the Board members would, beginning with you, Brad, identify yourself and speak to conflict of interest.

CHAIR CLAWSON: Okay. My name is Brad Clawson. I'm a member of the Advisory Board. I'm the Work Chair. I'm not conflicted at Fernald.

MR. PRESLEY: This is Bob Presley.

I'm a member of the Advisory Board, and I'm not conflicted at Fernald.

DR. ZIEMER: Paul Ziemer, Advisory Board, not conflicted at Fernald.

MR. SCHOFIELD: Phil Schofield, not conflicted.

MR. KATZ: Do we have Mark Griffon? Mark, have you joined us?

(No verbal response.)

Okay. Let's move on. Maybe Mark will join us before we get through the roll call. Then same thing for the NIOSH ORAU team.

MR. ROLFES: All right. This is Mark Rolfes. I'm a Health Physicist from NIOSH. I have no conflicts.

MR. CHEW: Mel Chew, ORAU team, no conflict.

MR. RICH: Bryce Rich, ORAU team, no conflict.

MR. SHARFI: Mutty Sharfi, ORAU team, no conflicts.

MR. MORRIS: Robert Morris, ORAU team, no conflicts.

MR. POTTER: Gene Potter, ORAU team, no conflicts.

MR. KATZ: Great. I think that does it for the NIOSH ORAU team and then moving on to SC&A.

DR. MAURO: John Mauro, SC&A, no conflicts.

DR. MAKHIJANI: Arjun Makhijani, SC&A, and I'm in conflict.

MR. CHMELYNSKI: Harry Chmelynski, SC&A, no conflict.

MR. KATZ: Can you say your name again? It was hard to hear.

MR. CHMELYNSKI: Chmelynski. That's spelled C-H-M-E-L-Y-N-S-K-I.

MR. KATZ: Thank you.

And now for other HHS, DOE or DOL staff on the line.

MS. HOMOKI-TITUS: Zeda Homoki-Titus from HHS and no conflict.

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

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

MR. KATZ: Anyone from DOL or DOE?

(No verbal response.)

Okay then. Next let's go to either Fernald petitioners or other site employees or survivors.

MS. BALDRIDGE: Sandra Baldridge, Petitioner.

MR. KATZ: Okay. Are there any others? How about Congressional staff? Any Congressional staff?

(No verbal response.)

And any other members of the public who would like to identify themselves?

(No verbal response.)

Okay. Then just checking back for a second, Mark Griffon, have you joined us?

(No verbal response.)

Okay. No luck with that, but maybe

he'll join us in a little bit.

And I just want to introduce to everyone. We have a new court reporter for this meeting. His name is James Salandro, and so for this meeting if everyone would be mindful to identify yourself before you speak since he's not going to recognize your voices, that would be great. That way we have a transcript that people can follow.

And then just lastly let me just speak, remind, everyone about phone rules. Everyone who is not speaking please keep your phone on mute. Use *6 if you don't have a mute button and please no one put the call on hold which interferes with the discussion. Instead if you would just disconnect and reconnect again, that would be better for everybody.

Much thanks and it's all yours now, Brad.

ADMINISTRATIVE MATTERS

CHAIR CLAWSON: Okay. Thank you,

Ted.

First of all, I want to make sure that all the work group got the information that was sent out from SC&A on this Fernald Work Group. What we're actually dealing with today is the completeness. It's an investigation on the completeness of the Fernald data. And what I've asked SC&A to do is put together a sampling plan and this is what we're going to discuss today to be able to make sure that we have completeness of data and that we have good information out there, and I just want to make sure that everybody has got a copy of this as far as the work group and NIOSH and so forth. Has everybody got this?

DR. ZIEMER: What's the date and what's the title of the document? This is Ziemer. Date and title of the document?

CHAIR CLAWSON: Paul, it was on May 5, 2008.

DR. ZIEMER: Okay.

CHAIR CLAWSON: And there were two of them on there and it has a sampling --

DR. ZIEMER: I thought maybe there was something recent.

CHAIR CLAWSON: No. I just want to make sure that everybody had this. We didn't have this at Redondo Beach. I wanted to make sure that everybody did have this. Arjun I believe sent this out well on May 5th on this, and this is what we're going to be going over, and from SC&A, who is going to be discussing this sampling plan? Is that going to be you, Arjun, or John?

DR. MAURO: Brad, this is John. I'll be presenting it, but because it contains two fundamental elements, one I call the design of the strata and the other I call how many samples do you take from each strata. That work was done by Harry Chmelynski who is on the line. He's our statistician. So I think I'll probably start it off by laying out the overall approach, and then we'll allow

Arjun and Harry to develop it further.

CHAIR CLAWSON: Okay. If there are no further questions then, John, I'm going to turn this over to you and let you go from there.

PRESENTATION

DR. MAURO: Thank you. I --

DR. MAKHIJANI: Brad, before we start, this is Arjun. I got an email from Mark saying that he had not received the two documents even though I had sent them to him twice.

CHAIR CLAWSON: Okay.

DR. MAKHIJANI: I sent them to him again and then in an email he said that he will not be on the call until approximately 10:40 a.m. I just wanted you to know that.

CHAIR CLAWSON: Okay. I appreciate that, Arjun. Did he get the documents? If not, I was going to forward them from my computer or whatever.

DR. MAKHIJANI: Well, it might be

good because I sent them to him twice from Redondo Beach, and he did not get them. I think all of the rest of you did get them.

CHAIR CLAWSON: Right.

DR. MAKHIJANI: And I sent them again yesterday for the third time. But I have not heard from him since.

MR. PRESLEY: Brad, this is Bob Presley.

CHAIR CLAWSON: Yes, Robert.

MR. PRESLEY: I didn't get anything from Arjun yesterday either.

DR. MAKHIJANI: No, I didn't send it to you yesterday, Mr. Presley. I sent it during the Redondo Beach meeting, and I think everybody except Mark got them. There were some, I think, glitch in his email.

CHAIR CLAWSON: Yes, these were dated back on May 5th. That's when I got mine. It was just, I believe, Mark was having trouble. These are the same ones that were sent out on May 5th.

DR. MAKHIJANI: And then I sent them again during the Redondo Beach meeting. I can forward them to you again, Mr. Presley, if you would like.

MR. PRESLEY: Well, they need to come to my government address this time. I'm at work now.

DR. MAKHIJANI: Okay.

MR. PRESLEY: Brad, have you got my government address?

CHAIR CLAWSON: I don't think I do, Bob. I'm sorry. All I have is your -- let me go into this one, and I'll see what I can do for it.

DR. MAKHIJANI: If you give it to me, Mr. Presley, I can send it to you right now. I have the document right here.

MR. PRESLEY: I might not be able to receive it from you, Arjun.

DR. MAKHIJANI: Okay. Fine.

MR. CHEW: Hey, Mark, this is Mel.

MR. ROLFES: Yes.

MR. CHEW: None of us on the ORAU team has received the plan. Is that true?

MR. ROLFES: Okay. I have a copy of it and I did send it to you as well, Mel.

MR. CHEW: Okay.

MR. ROLFES: During the week of the Redondo Beach Advisory Board meeting.

MR. CHEW: I'll have to look. Thanks.

MR. ROLFES: I can resend it to both Bob and Mel.

MR. PRESLEY: Yes, I was going to say. Mark, if you don't mind, send it to the government address. Okay?

CHAIR CLAWSON: That probably would be best then.

MR. KATZ: Mark, this is Ted. If you send me a copy at the same time, that would be great. Thanks.

MR. ROLFES: I will.

MR. SHARFI: And to Mutty too please.

MR. ROLFES: Mutty, all right.

MS. HOMOKI-TITUS: Can you send it to Liz and Emily as well?

MR. ROLFES: All right.

MS. HOMOKI-TITUS: Thank you.

MR. ROLFES: All right. We have Liz, Emily, Mel, Bob.

MR. POTTER: And send one to Bryce and Gene, too? Sorry about that.

MR. KATZ: All right. Mel, if you could send that onto Gene for me please.

MR. CHEW: I will do that.

MR. KATZ: Okay. Thank you.

MR. ROLFES: Okay. It should have been sent to everyone. I don't know how fast my email will go.

MR. KATZ: I just got it, Mark. Thank you.

MR. ROLFES: Okay, great.

DR. MAURO: Brad, should I begin?

CHAIR CLAWSON: If everybody has gotten this, it sounds like without any

objections I would say yes. I just got Mark's indication that he would be a little bit late getting on here. So, John, I'll turn it over to you.

SC&A PRESENTATION

DR. MAURO: Okay. Thank you. I would like to set the stage. A good way to look at this is we have our site profile review and began our site profile review process. We have -- by the way, that site profile review was prepared by Arjun, and then we have our SEC petition review and that was delivered. That was prepared by Hans. He led the effort.

And now what we have is we're moving on into primarily one particular very important aspect of the SEC petition review process, but, of course, it also has applicability to the site profile and that aspect is the completeness review.

As we all know, there's a great deal of data, bioassay data, and external

dosimetry data at Fernald and the evaluation report establishes that on the basis of that dataset there is good reason to believe that all internal doses can be reconstructed with sufficient accuracy, and this goes to the heart of what we're going to be talking about today. We, SC&A, have prepared a sampling plan which has a very specific objective, and that is to evaluate the degree of completeness of the internal dosimetry records so that we could put the Board in the position to help make judgments on whether or not the record and doses can be reconstructed with sufficient accuracy.

The report you received is really a statistical work that's going to require some explanation and that's why it's important that both Arjun and Harry Chmelynski be on. But let me explain to you conceptually what it does. Using our experience and familiarity with the Fernald site and with the datasets, bioassay datasets, characterizing the internal

exposures for the workers as represented in the evaluation report site profile, we went ahead and said, "Well, in order to convince ourselves or evaluate the degree of completeness, we broke the activities at the site up into strata." Strata means different buildings, different work categories, different time periods, and the question we wanted to ask is for all of these different groups of workers sorted according to these different strata --

CHAIR CLAWSON: John, excuse me for a minute. I don't know if everybody else is hearing this, but somebody has not gone onto mute and we're getting a lot of background noise. If I could just remind everybody to put their phone onto mute, *6 if you don't have a mute button, I would greatly appreciate it.

Go ahead, John.

DR. MAURO: Okay. Thank you.

MR. GRIFFON: Just so you know,

Mark Griffon. I'm on now. I don't think it was my phone, but I'm on the call.

CHAIR CLAWSON: Okay. I appreciate that. Mark, it's good to hear you. John has just started into the very beginning of the sampling plan. So you're just -- we just barely started, Mark.

DR. MAKHIJANI: Mark, did you get the documents I sent you this morning or last night?

MR. GRIFFON: No, I didn't get the documents, but I'll follow along. I'm sorry. Something is going on with my email.

DR. MAURO: Okay. Good morning, Mark. This is John, and I'll pick up. I was just beginning to explain the concept of strata.

MR. GRIFFON: Yes, I was listening in. So go ahead.

DR. MAURO: Okay. Very good.

MR. GRIFFON: Yes, that's fine.

DR. MAURO: So what happened is now

we developed what we consider to be the groups of workers that we feel that if we were to go in and sample the bioassay data from these different separate groups and download the data and evaluate it, there will be two questions we could answer.

One is, first of all, we can get a sense of how complete the data are. For example, let's assume. Right now this is conceptual. We'll actually get into the specifics. But let's assume we have a group of workers that work in a given building in a given year and we are in and we know that we're concerned or interested. Let's say there's a lot of workers, 1,000 workers, that worked in that year in that building, and NIOSH's position is we believe we can reconstruct the internal exposures to those workers because we have bioassay data. We have, let's say, urine samples that were taken approximately monthly or quarterly or whatever the time period as reported and represented in

their site profile and evaluation report.

Well, the Board has requested SC&A go and develop a sampling plan to evaluate how complete is that data for that strata and so what we did is we go ahead and we design a -- and say, okay. How many samples do people in that year for that group of workers do we want to grab in order to give us a sense of how complete the data are? For example, let's say you have 1,000 workers, but it turns out only ten of them have bioassay samples. Well, you know, then there would be a problem. But if you had 1,000 workers and they all had extensive bioassay samples, then, of course, we'd be in very good shape.

But the question becomes how do you -- you don't want to go in and pull all the bioassay samples from all 1,000 workers in that strata and download all that data and look at it all. It's just too time-consuming, too expensive, and unnecessary in order to answer the question.

So what we do is develop a sampling plan whereby we say how many of those workers in that year of their records do we want to pull? And here's where, so the first step in identifying the strata, that is those worker groups that we would like to break up the whole population of workers over the entire time period of interest into, that first step is just developing the strata. What we'd like to -- That was done and it's contained in this report and that was done primarily by Arjun who took the lead on that given his familiarity of the site and identified the strata of interest.

So I guess question number one that we're going to be posing to the work group is do you feel that the strata that's been selected and the rationale for the selection of that strata will meet your needs. Once we accomplish that and I think that's really the first step in the process. That is agreeing that we've selected the proper strata that

need to be sampled.

The next thing, the second part, is okay, how many samples, let's say, of workers do we want to pull from the records and download the data and review? You know, theoretically if there are 1,000 workers in a given year, the number you sample, the more you sample, the more assurance you have, the more confidence you have, of understanding how complete that record is. So what our statistician did for us he said the following, well, for any given strata if you sample these many within that strata you could have a certain level of confidence and make an expression of what percent of the workers.

See, we're mainly interested in saying what fraction of the workers had bioassay samples in that population of workers. And so our sampling program is designed to make a statement. That is, if you sample these many workers within that strata, depending on how many samples, if you sampled

them all, then, of course, you have 100 percent confidence in knowing how many workers were, in fact, bioassayed in that strata. But we don't want to sample all of them and we don't think it's necessary to achieve 100 percent confidence that we can make a statement on that level.

We could actually make a statement that said, well, we could be 95 percent confident that this percentage of the workers were sampled. So now we're talking a little bit of statistics and I'm going to be turning it over to both Arjun and Harry in a minute. But you can almost think about it this way. If I have 1,000 workers and I say, geez, you know, I'd like to be able to say with some level of confidence that at least 50 percent were sampled. That is, 50 percent had bioassay samples and I'd like to be able to know that with a high level of confidence. If I could walk away from this sampling program where at the end I could say with a high level

of confidence that at least 50 percent of the workers in that population were, in fact, bioassayed and I could say that and I would feel that and here's where we're trying to go with this. I would say, gee, there's certainly a large fraction of the workers, based on our sampling we can say with a high level of confidence that a relatively large fraction of the workers were, in fact, sampled, bioassayed, in that strata and if we would -- and on that basis and here's where the judgment comes in, on that basis, one could make a judgment whether a bioassay program, whether a co-worker program, can in fact be built.

For example, if I say there are 1,000 workers and based on a sampling plan, I could say that at least 50 percent of those workers or 75 percent of those workers were, in fact, sampled and were, in fact, bioassayed, then I know the relative completeness of the bioassay program.

MR. GRIFFON: Hey, John.

DR. MAURO: Yes.

MR. GRIFFON: Can I just question one thing?

DR. MAURO: Sure.

MR. GRIFFON: I follow you completely and that's --

MR. KATZ: I'm sorry to interpret, Mark, but just please -- I'm sorry you missed it. But we have a new court reporter, James Salandro, and so people need to identify themselves when they begin to talk.

MR. GRIFFON: Sorry. I knew that, too. Mark Griffon. I'm sorry.

Yes, John. I had a question on -- I think you said it at the very end of that. Everything you're driving toward here is answering a question of can an adequate co-worker model be developed or be used to reconstruct doses. The question I have is is there a co-worker model on the table for uranium. I thought, you know, I thought we

had two questions here. I thought we had a question of is the -- based on the sampling are the individual records of sufficient completeness to reconstruct individual doses and then the secondary question would be if they're not are their overall records sufficient enough to develop a co-worker model. I don't think we -- Maybe I'm wrong, but --

DR. MAURO: Mark, this is John. You're absolutely right.

MR. GRIFFON: Yes.

DR. MAURO: You're doing a better job describing conceptually what we're trying to accomplish.

MR. GRIFFON: Okay. So there's two parts. I just don't want to lose that in your up front description.

DR. MAURO: Mark, it's --

MR. GRIFFON: Is there a uranium co-worker model on the table? I don't think so yet or maybe there is. We have so many

sites that we're dealing with. Can somebody answer that question? Is there an uranium co-worker model?

MR. ROLFES: Mark Griffon, this is Mark Rolfes. Right now, I do not believe the internal dosimetry technical basis document for the Fernald site does have -- I don't believe it has a co-worker model in it. However, we have the data that would allow us to develop one as we revise the technical basis document.

However, if you recall the number of individuals that were unmonitored for uranium was very low and so the applicability and the need for a co-worker model is very small for Fernald.

CHAIR CLAWSON: Well, Mark, this is Brad Clawson. One of the things that and one of the reasons why I was pushing towards this sampling plan was because one of the things that NIOSH wanted to put out was that if any of these employees showed up with uranium in

their urine samples then they were going to give them this other host of radionuclides and this is kind of part of the reason why this is so important for this strata type deal and that's one of the reasons why I was interested in this sampling plan. I guess my question to John here is is this going to be able to accomplish that part of it or --

MR. ROLFES: Before John responds, this is Mark Rolfes.

CHAIR CLAWSON: Right.

MR. ROLFES: For example, if an individual has uranium urinanalysis results then we typically can use that to assign an intake of uranium.

CHAIR CLAWSON: Right.

MR. ROLFES: And to that intake of uranium we would also assign other radionuclides. The number of people who do not have uranium urinanalyses is very low and so for those individuals on a case-by-case basis we would determine an individual's

potential internal exposure. There have been some cases that have been completed with co-worker models essentially using information.

For example, if we had an engineer or something perhaps that enters the site for a small amount of time and did not have a uranium urinanalysis we could use an uranium urinanalysis result from another engineer. However, like I said, we do not have a formal co-worker model that I'm aware of.

But if an individual truly is in a radiologically controlled area and is not monitored for internal exposures, we would assign uranium intakes if that individual had a potential for internal exposure. Then we would treat that claim similarly. We would also assume that the individual was exposed to recycled uranium. After we estimated the uranium intakes, we would assign intakes of, for example, neptunium, plutonium and technetium-99.

MR. SCHOFIELD: Mark, this is Phil

Schofield. I have a quick question for you. On those that do have internal uranium analysis, was that strictly -- did they look at that or did they look at to see if there were other contaminants in there?

MR. ROLFES: Well, the large part of the information. For the large part of the operating history, the uranium urinanalyses were conducted using fluorimetry which determines a mass amount of uranium in urine. So they would get information about the mass of uranium being excreted from the body following either ingestion, inhalation or some of other method of entry such as a wound.

In the more recent time period, they started doing more detailed analyses such as kPa, kinetic phosphorescence analysis -- I can't think of it. If there is somebody that can help me out there. They also did mass spec of uranium to determine the isotopic composition of that uranium.

MR. SCHOFIELD: So let me just get

this clarified. So the early uranium analysis did not look at anything but uranium, just the mass of the uranium.

MR. ROLFES: It looked at the mass of uranium, correct. However, that does not prevent us from doing dose reconstruction for other radionuclides and we have described how we would do the dose reconstruction by assuming essentially worst case scenarios for recycled uranium, the concentrations of the radioactive material that would have existed in very small quantities. We've assumed the worst case.

I believe we're assigning, now if Bryce Rich could help me out, once we have calculated a uranium intake we would be assuming that an individual was exposed to plutonium, neptunium and technetium. I believe the plutonium concentration that we were assuming would be on the order of 100 parts per billion.

MR. RICH: That's correct, Mark.

MR. ROLFES: Okay. All right.

MR. RICH: One thing to add just briefly, Mark, in the early days they were aware of the contaminants in recycled uranium, but they had calculated that the dose would be a less than 10 percent increase plus the fact that the analytical capabilities with a more higher of this material like plutonium and neptunium were not sufficient to even see.

So in the early days, they did not do specific contaminant analyses other than on occasion they did a sample or two but not routinely.

MR. ROLFES: Right, and we do have information that shows that the technical laboratory at Fernald did also do some analyses to determine if there were any of these other radioactive materials in with the uranium.

MR. GRIFFON: This is Mark Griffon again. I didn't mean to get off the topic of the plan, but I just wanted to refocus John on

the, I mean, we have to be careful to answer the question of can we -- is there sufficient data in each person's file to reconstruct internal and external doses especially where there's not even a co-worker uranium model on the table right now. So as long as you're looking at both those phases, I'm okay with where you're going and I'll turn it back over to you. But I just wanted to get that point across.

DR. MAKHIJANI: Mark, this is Arjun. John and I actually had a discussion about this this morning and as he said, you're exactly right. Part of the things that stratify the sampling by date and plant is to try to get an idea as to whether if people were on a monthly sampling plan whether there were actually samples monthly or annually or whether years were missed and, for example, I'm looking at the evaluation report. In 1953, the external monitoring was for 1,739 employees but the internal monitoring was for

753 employees.

So while the overall number of records may be comparable, there's a question for people in particular years perhaps and this sampling plan has been stratified to discover where you might need a co-worker model, if you do need it, and what periods and workers it might apply to and I hope also whether to some extent there is sufficient data in those years or subsequent years depending on production parallelism to be able to construct that co-worker model.

MR. ROLFES: This is Mark Rolfes. The entire reason that we have a co-worker model is in case anyone did not provide a bioassay for uranium. To stratify it, I'm sure there may be one person or one case where an individual was not monitored routinely or did not provide a urine sample. That is exactly why we have a co-worker model to assign intakes of uranium.

DR. MAKHIJANI: Yes, exactly. I

agree with that. The point here is that if there are very, very few people who don't have monitoring data that, of course, there's not a lot of worry about. But if there are significant gaps or people who are not monitored and depending on what jobs they were in or what plants they were in, what periods they were in, then it will be up to the working group to make a judgment as to where we go from there and the sampling plan is essentially designed to tell you that.

DR. MAURO: Let me, there's a concept here regarding a co-worker that I'd like to --

CHAIR CLAWSON: Sorry, but just to say that's John Mauro speaking.

DR. MAURO: Yes, John Mauro speaking again. We've heard a lot of discussion. I think this was an important diversion, not diversion, but clarification. In effect, NIOSH's position is that bioassays, urine samples, were taken from virtually all

workers and, of course, but at the same time they will acknowledge that not all workers do we know isotopically what the radionuclide mix might be and what the enrichment might be, whether or not there was any recycled uranium with plutonium present. So, in other words, it's a richer problem the fact that you might have a urine sample that measures in milligrams per liter will certainly give you some information about the amount of uranium that the person may have taken in at that point of time and at that location and at that point in time.

But, of course, in theory the assumptions regarding the mix of radionuclides that accompany the uranium, whether it includes as I mentioned earlier, whether it's enriched and what degree of enrichment and whether or not it contains any recycled uranium. That's a form of a co-worker model in a way. What's surrogate. In other words, there's a way to deal with missing

information.

So our sampling plan really is designed to not only answer the question, "How complete is the dataset for any given strata" and, of course the strata, where we break them up is a judgment call, where we think by looking into each window and looking at the workers in each of those windows we'll get a good feel for whether or not there is a complete dataset by sampling a certain percentage of the workers in any given strata and seeing if, in fact, they all have some bioassay samples or maybe we find only 50 percent have bioassay samples. By sampling within that strata, we'll be able to answer the first question, I think, and that is how complete in terms of -- do, in fact, all workers in that strata -- how sure are we that all workers or virtually all workers in that strata have bioassay samples for that year?

By sampling the program the way we plan to sample, we will be able to make a

statement at the end that, "Yes, we have a high level of confidence." We'll be able to make a statement like this. "We have a high level of confidence that at least 75 percent of the workers have annual bioassay samples." We would be able to make a statement along those lines.

Now that in itself would mean that -- it's possible at 100 -- we may find that when we pull the sample, let's say we sample 100 workers, and we see that out of those 100, 75 have at least one sample per year, let's say, a urine sample. We will be able to make a statement regarding completeness there. I mean in simplest terms we'll be able to make a statement on that basis alone just common sense, we know from that sample it looks like about 75 percent of the workers have at least one bioassay sample.

But we'll be able to make a more powerful statement, more powerful in terms of statistically, what level of confidence can we

say. Well, we're highly confident that at least 50 percent. We may be able to walk away with a statement like that and we will also be able to say, "We also know that within that sample not 100 percent of the workers were sampled. There are workers who don't have urine samples in that strata in that year."

So the sampling program, we'll be able to deliver that first, I think, very important fundamental rock we can stand on. We'll be able to make a statement of the degree of completeness in that given strata.

DR. ZIEMER: John.

DR. MAURO: Yes.

DR. ZIEMER: Paul Ziemer here. Let me ask one question for clarification or maybe it's more than one question. But as a starter forgetting about the individual strata, if you looked at the whole group, everything combined, and I'm thinking of this as the classical statistical things where you have the white marbles and the black marbles in a

bag and you want to know what the distribution is. Right? We can do that for the whole group. We already know that the percentage of bioassay is what? Ninety percent or something like that?

MR. ROLFES: Correct.

DR. ZIEMER: Now, knowing that, if you had someone with still bioassay and there was a co-worker model, I assume you would use that. Right?

DR. MAURO: Are you posing that question to me? I would say that we'd have to know if there's --

DR. ZIEMER: Well, yes. What I'm really trying to get at is do we need to know the strata. Would there be different co-worker models for different strata?

DR. MAURO: My answer would be yes.

DR. ZIEMER: Okay. That's what I'm trying to get at.

DR. MAURO: Or it would reveal -- I would go a step further. It would reveal

whether you need separate -- in other words, by sampling different strata, we may find out that the differences -- if there is one co-worker model, we'd be in a position to judge because we've sampled different strata which approach to develop a co-worker model --

DR. ZIEMER: The same one would apply for everyone.

DR. MAURO: For everyone. That would apply to everyone or is it possible there might be by using that, if there was in fact a co-worker model out there right now, the sampling program we would propose, that we're proposing, would help you understand the degree to which it would be clean and favorable for all workers in all strata. You want to be in the position to be able to make that statement.

DR. ZIEMER: So, for example, if you found that, let's say, in plant five that the percent of sampling was very different from the others and also that either the

nuclides handled or the work conditions were such that sort of a general co-worker model would not apply, then you would propose or would suggest considering a different co-worker model for that subset or that strata. Is that correct?

DR. MAURO: This is John. We wouldn't suggest that we point out the weaknesses of the co-worker model --

DR. ZIEMER: Yes.

DR. MAURO: -- as applied to that particular strata. For example, let's say -- We know there is no co-worker model. But let's assume for a moment that the assumption is that we're going to assume that all workers were exposed to two percent, 2.5 percent, of -- enriched uranium for those samples where we only have milligram per liter values.

DR. ZIEMER: Dr. Mauro.

DR. MAURO: Yes.

DR. ZIEMER: What special project was that?

DR. MAURO: I'm sorry. I didn't say there was.

DR. ZIEMER: On what special project was the two percent enrichment?

DR. MAURO: Am I correct that that's your default assumption?

MR. ROLFES: Our default assumption after 1961 would be two percent. I take that back. After 1964 I believe. I would have to check with the technical basis document. You had talked about the earlier days.

DR. MAURO: We're not there yet in our discussion. I guess I'm trying to give conceptually more than explicitly the idea of why strata, breaking down the operations into strata has value. I mean, that's really what I'm going to rather than looking at it as one large group of workers over all time in all buildings and all worker categories. Why there is value into breaking up the population of worker years into strata because we may find that there are segments of workers that

have experienced exposure situations which do not fall within the envelope or one may not have been monitored extensively and there may be a group that is relatively unmonitored and we need to know. We'd like to know that.

Second, we'd like to know whether or not there's a group where your approach to doing those reconstructions, for example, the two percent enrichment assumption, may not apply for extended periods of time. So in effect whether you want to represent it or not in this way you effectively do have a co-worker model. The co-worker model basically is that all workers for all intents and purposes have bioassay data and we have sufficient information to be able to place a plausible upper bound on what the level of enrichment might have been for those workers and also to place a plausible upper bound on what the level of recycled uranium such as plutonium is in the urine.

DR. MAKHIJANI: Let me jump in here

a little bit.

DR. MAURO: Sure.

MR. KATZ: Wait. Please identify yourself.

DR. MAKHIJANI: This is Arjun Makhijani. I'm not sure that we have a level of granularity in the sampling that will allow us to determine the individual enriched uranium runs. I don't know if those are even in the worker data. At least, I have not seen that. Mark might correct me if I'm wrong.

But the point that we had raised in finding 12 of our site profile review and in other places was that enriched uranium processing actually goes back into the 1950s and did not start in 1964. The materials, the accounting data, from Fernald do indicate enriched uranium starting sometime in the 50s. I forget the exact date, maybe `55.

MR. ROLFES: That's correct. That's correct, Arjun.

DR. MAKHIJANI: And so we had

questioned that and as you know, Mark, there were short campaigns and periods when enrichment of more than two percent was handled and the other question that we had raised is why for most workers, the vast majority of workers, it's claim and favorable to assume two percent all the time. We couldn't see that it had been demonstrated for those workers who actually dealt with five and ten percent uranium.

I think that that is a little bit of a diversion. I do not believe that we're going to discover that level of -- and perhaps we will, but certainly I don't want to promise that to the working group and then come up short. That's not in the design and I don't even know that it is there in the worker record. Mark, you're more familiar with them than I am.

MR. ROLFES: Yes. This is Mark Rolfes and I would like to address what you have stated. In the early days the typical

enrichment was -- for example, for those of us on the phone normal uranium is roughly 0.71 percent U-235. Anything that was above 0.71 percent was referred to as enriched.

One of the major products I guess at Fernald, the enrichment, was 0.95 percent, still less than one percent U-235. There may have been a special project. For example, there were some runs of 1.25 percent enrichment. That would not have a significant impact on a person's reconstructed internal dose and it wouldn't affect someone's external dose significantly either.

For example, in the years after say mid 1960 there were some special projects where they handled three percent or five percent enriched material and if you do take a look in the records, for example, there are some reports for these special projects that were conducted and there are actually changes to the mobile in vivo radiation monitoring laboratory data indicating that these

individuals were working on a special project in this plant and these are the results of their lung counts. So it is documented in individuals' monitoring records.

MS. BALDRIDGE: This is Sandra.

MR. ROLFES: Yes, Sandra.

MS. BALDRIDGE: I don't know that the credibility of this data has even been established based on the Fernald historical documents that discredit the use of the urinanalysis record for determining internal dose.

MR. ROLFES: Okay. This is Mark Rolfes once again.

The monitoring that was done for uranium, uranium is different. They were worried about heavy metal toxicity and renal damage and so bioassays were collected to ensure that people were not excreting above a certain level of uranium in their urine because they were concerned about the chemical effects of uranium on the kidney function.

The purpose of those urine samples being collected was for chemical toxicity because that was the threat to a person's health.

For natural uranium and depleted uranium, they were not concerned about radiation dose to internal organs. But the fact that those urine samples were collected, it does not matter what the purpose of the collection was. It does not prevent someone from calculating with sufficient accuracy the internal dose that was received.

MS. BALDRIDGE: But I think it does interject a translation issue. I mean you can have the measurement, but there are certain factors that may not be known to you in the use of those that were known by the Fernald personnel who wrote the documents stating that those database documents, that information, could not be used for the determination of internal dose whether directly or indirectly.

MR. ROLFES: I understand what you're saying and there was a statement

because they did not believe that there was a bioassay model that would allow us to interpret the results to give a specific and precise dose estimate to each of the various organs in the body. Some of the older biokinetic models that were used to describe where uranium went in various organs after it was inhaled or ingested were in their infancy in the early years.

The bioassay models that we have now, the ICRP Models 66 and 68, that we use for calculating internal dose, those are much more detailed and provide a much better basis of where uranium is distributed throughout the body and how long it takes to be excreted from one compartment into another or out of the body, etc.

MS. BALDRIDGE: But that doesn't address the record-keeping accuracy.

MR. ROLFES: I do acknowledge that that does not. But what NIOSH has done is done an analysis of the hard-copy data to

determine whether that hard-copy data was accurate, complete, etc. and this information has been provided to the Advisory Board. Let me see, I have a document comparing the Fernald hard-copy bioassay records to the 1020 database.

MS. BALRIDGE: So I'm assuming then that it's a consensus of the Advisory Board that the uranium urinanalysis records are credible and useable for dose reconstruction.

MR. ROLFES: Now I'll let the Advisory Board members speak, but the NIOSH position is that those uranium urinanalyses are complete. Where there are incomplete records, for example, if an individual entered the site and did not have a bioassay sample collected, that individual for a dose reconstruction that NIOSH would complete we could use a co-worker model and depending on the individual's operation that he was involved with we could assign, for example, the 50^{th} percentile of the intakes from

individuals who were monitored for uranium or the 95th percentile which would be an upper bound for the individual's potential internal exposure. So it's really not necessary for us to stratify the data.

That was the entire reason we developed a co-worker model so that if an individual was unmonitored we could use individuals who were monitored to bound the unmonitored individual's dose.

CHAIR CLAWSON: Mark, this is Brad Clawson. I thought that a little while ago you mentioned to me that we didn't have a co-worker model.

MR. ROLFES: Correct. It has not been formally approved that I'm aware of. Now I believe Mutty had indicated to me. Let's see. Did you believe that there was one developed and I am not sure about the status of the co-worker model. But Mutty said that --

MR. GRIFFON: Mark, this is Mark

Griffon. I just wanted to answer Sandra's question. The data credibility is still an action item as far as I know in our matrix and Mark is correct that NIOSH gave us a response. But I don't think the work group has looked at that and dealt with a response.

So we're not at that point yet of saying we have no issues with the data credibility. At least, I'm not. We still have to close that item out on our list of issues in the matrix. But that is a separate item, but it's still on the table.

MS. BALDRIDGE: I'm glad you clarified that because I wasn't aware that things were being proceeded on the assumption that everything was --

MR. GRIFFON: I'm pretty sure that's the issue or that's an appropriate response, Brad. If I'm incorrect, you can correct me.

CHAIR CLAWSON: No, I'm sorry, Mark. I should have taken care of that with

Sandra. That's one of our issues that's still on the Board and we're still trying to evaluate that in the matrix and so forth and we were kind of hoping a little bit that this strata and so forth may bring a little bit of light to that and that was my impression.

MS. BALDRIDGE: That's what I understood.

DR. MAURO: Brad, this is John Mauro again. That goes toward the second objective. In effect, we've moved into the conversation on after you can make a statement regarding the completeness of the record in any given strata then you go and that statement is made. That's the easy part.

Now we get to the part where we actually go in and when we download all these data, let's say we decide in a given strata we're going to pick 30 worker years, we're going to pull the records for those 30 worker years and we're going to download all that data, that bioassay data, and put it into a

table. So we say, "Okay, here are the measurements in this year for worker number one, for worker number two, worker number three." We're going to have the actual data that were measured.

Now we're getting into the place where not only can we say something about completeness, whether or not, yes, all the workers were -- it appears that most workers or the large majority were in fact bioassayed.

But we would be able to make a statement about the frequency of the bioassay at the beginning in a given year and we'd also be able to make a statement about the nature of the bioassay. That is what was done in terms of the type of measurements made on that urine for that worker in that year and we would be able to juxtapose that to te kind of work he was doing at that location in that year and the kind of radionuclides he might have been exposed to under those circumstances.

So now is where the richness of the sampling starts to pay off. That is we would be in a position to make statements that would confirm or provide qualifiers to many of the statements that we've just heard Mark describe related to enrichment, related to recycled uranium. So what I'm hoping is that once we have developed this table and this characterization and we'll have our radiochemists look at it. Joyce Lipstein will be looking at the data as she's doing right now on a Nevada test site and we'll be able to make certain observations regarding not only the completeness of the record, but what I would say does the information contained here appear to be of sufficient quality and completeness that you can reconstruct the doses for that worker, in place for that worker.

Now whether or not you have sufficient data also should emerge from this. Whether it seems that you have enough workers

and this is really a judgment call now, not one to be made by SC&A. But we would provide a statement regarding whether or not we felt that the records for a given worker in a given year can be used to reconstruct his doses given our understanding of where he worked and what he was doing at that time.

But also we'll be in a position to start to talk about whether or not for those workers that were not monitored or incompletely monitored whether the co-worker model that is being proposed and that theoretically can be developed would work. That is if it turns out only a very small fraction of the workers were actually bioassayed in a given strata, well, of course, it would start to beg the question whether or not your co-worker model will work and can be used for that worker if you feel that they were -- because they were in that strata, that means they're in a different circumstance than other workers. So if any co-worker model that

would be developed for a group of workers that may be in the strata that was only monitored very infrequently, then it would really help NIOSH, the way I see it, make judgments onto whether or not the co-worker model that they may want to entertain would apply to that particular strata or whether that strata has certain unique characteristics whereby it would have to be dealt with in a special way.

And that really in effect concludes my part of this in terms of trying to conceptually explain what it is we're trying to achieve by sampling the way we designed our sampling program. It is designed for one to make a statement regarding how complete the record appears to be or workers in any given strata and, secondly, a statement should be able to be made regarding whether or not the actual bioassay program for the workers in that strata provides sufficient information that the doses can not only be reconstructed for that worker, but also in theory is there

enough information about the bodies of workers in that strata for those workers where the monitoring was incomplete or some workers that were not monitored at all, whether or not it's possible to develop a co-worker model from the data within that strata to build a co-worker model for that strata. And I think that's about what we'd be able to accomplish with the program as we've laid it out right here.

With that, I'd like to sort of get to the high level of resolution and ask both Harry and, well, anyone else who had any questions of course, but both Arjun and Harry to provide a little more granularity to this conceptual design.

DR. ZIEMER: A question first. This is Ziemer. Am I on the line? I can't remember if I'm muted or not.

DR. MAURO: We hear you.

DR. ZIEMER: Okay. Good. My question really is to Sandra because I'm afraid I don't have the petition opened before

me. But I was trying to remember for the petitioners. Was their concern about the actual quality of the data in terms of either allegations of people in the system there fudging data or changing it or anything like that?

MS. BALDRIDGE: I believe there were three to four documents that were historical documents from National out of Ohio, Fernald, that stated that their data could not be used to determine internal dose and this was in response to questions asked by, I believe, the Department of Energy so that they knew whether determinations could be made on exposure to people.

DR. ZIEMER: What were the dates on them? Were those early documents?

MS. BALDRIDGE: Yes. They're in the petition. I don't have the specific numbers.

DR. ZIEMER: Yes. That's part of it and I tend to agree with Mark on that. I

think if you use the -- if you go back in time, the biokinetic models for relating urine output to organ dose were rather crude. But today's models are quite sophisticated and so at least on the surface if you have valid urine data and for uranium all you need is the mass because the mass in using a specific activity you can calculate the activity precisely.

But I think that part of it I'm pretty comfortable with. I was concerned that there might have been allegations of tampering with the data that would render its validity in question.

MS. BALDRIDGE: I don't know about the tampering, but I don't think it's been resolved about the potential renal damage effect on the accuracy of the excretion levels and I don't think --

DR. ZIEMER: Yes. That was an issue we discussed awhile back, whether the levels were high enough to cause renal damage

which in turn might affect the model itself in terms of output. Yes.

MS. BALDRIDGE: And NIOSH said that they did not have the records for the individual workers to be able to identify those men with renal damage.

CHAIR CLAWSON: Dr. Ziemer, this is Brad. Also, there were comments made that we're bringing into question the urinalysis and so forth, the frequency, how it was performed. There are some other things. There were some affidavits and so forth that were taken that were in questioning the sampling plan that basically Fernald went through and so forth like that.

DR. ZIEMER: Yes.

CHAIR CLAWSON: This is kind of another question. This is why we were looking at and this is why I proposed this to John because data integrity is one of our key issues that we deal with on any of these sites.

DR. ZIEMER: Exactly.

CHAIR CLAWSON: Because either one that's one of the things we're going for.

DR. ZIEMER: Yes. Thank you.

DR. MAKHIJANI: This is Arjun. Can I say a few supplementary things?

DR. MAURO: Arjun, this is John. Yes, please do. In fact, I was at the point where I wanted to pass the baton to you.

DR. MAKHIJANI: Just to round out the enrichment discussion there. I mean it's for the working group and NIOSH to decide, but a little quick back of the envelope check and one percent enrichment would make about a 15 percent difference and a 1.25 percent enrichment makes about 25-30 percent of the difference, something like that. So whether that's significant or not, I mean that's for you all to judge.

In terms of the sampling plan itself, there are a couple of other things that are important to know. As you'll see in

the sampling stratification plan that I sent Harry and to the working group, we are trying to discover who was monitored for thorium and the in vivo counting that was begun in 1968 and that went until 1986 and that's one of the reasons to have the flat strata and time strata that goes up to `67 and then from `68 to the end of the SEC period. I think it was `89 if I remember correctly. Is that right, Sandy?

MS. BALDRIDGE: It's through `89.

DR. MAKHIJANI: Through `89, yes. So since NIOSH plans to rely on in vivo data for thorium dose reconstruction and it's been a pretty significant item in the findings and on the evaluation report review, that's very important to discover in terms of completeness and whether there's adequate information, there for a co-worker model and who was exposed and who was monitored and so on. That's the other major thing that we're trying to discover with this.

DR. MAURO: Arjun, this is John Mauro. I'd like to just make one comment and as part of my review of the sampling plan. One of the things that did strike me was in the interim between when we started to assemble the sampling plan and the various work group meetings we had it became apparent that I guess either at least in some of the time periods that NIOSH would be depending on air samples, breathing zone air samples.

DR. MAKHIJANI: That's for the early period and that's a separate investigation. It's not covered in this particular completeness investigation.

DR. MAURO: Very good and, Arjun, that's why I bring it up. I just wanted to make sure that everyone understood that this sampling plan is not designed to address the air sampling of thorium program for doing dose reconstruction.

DR. MAKHIJANI: That's correct.

DR. MAURO: So it may turn out that

the working group may want to look at that separately. But right now that, in particular, very important subject is not really explicitly addressed in this sampling plan.

DR. MAKHIJANI: Yes, that's correct. We are not looking at area monitoring data. This sampling plan will only look personnel monitoring data.

DR. MAURO: Arjun, this is John Mauro again. Would you mind just giving us conceptually the way in which you broke the strata up and your rationale?

DR. MAKHIJANI: It's described in that memorandum which is dated May 5th. There are periods, 1951 to 1967 and 1968 to 1990. It goes one year beyond the end of the SEC period and then there is an oversampling for 1954 to 1957 because one of the plants, Plant 7, where there was soluble uranium processed, uranium hexafluoride, operated only for that period and so that's very important to determine

because highly soluble uranium could effect dose calculations materially for systemic organs and it would reduce lung dose but it would increase other doses. And that's the time period.

And then we also have the strata including the plant, Plants 1-9 and the pilot plant, and there is thorium and finally we have the two periods for external dose. I don't think the external dose stratification is as important because from the data in the ER it appears that there wasn't much variation in how external dose monitoring was done. There was some variation about how women were monitored. But other than that I don't think we're looking to discover a whole lot in external dose, but it's there. So we do look at it.

DR. MAURO: Arjun, I'm looking at Table 1 in the plan which it looks like these are your strata.

DR. MAKHIJANI: You're looking at a

different document than I was looking at.

DR. MAURO: Okay. I have the wrong --

DR. ZIEMER: I don't have a table in mine. This is Ziemer. My document doesn't show a table.

DR. MAKHIJANI: Yes. John is looking at a document that was prepared by Harry Chmelynski which is called, "Sampling Plan for Fernald Completeness Analysis" in which he took my strata and turned it into numbers as to how people would have -- how many records we'd have to pull.

DR. MAURO: Okay. So this is John again. I was not aware that the work group did not see this yet.

DR. MAKHIJANI: No, they have it.

DR. MAURO: They do have it?

DR. MAKHIJANI: They should have it.

DR. MAURO: Okay.

DR. MAKHIJANI: I sent it out.

MR. ROLFES: NIOSH has not seen this.

DR. ZIEMER: Was that sent out separately, Arjun? This is Ziemer again.

DR. MAKHIJANI: No, it was sent out at the same time in the same e-mail.

MR. ROLFES: The only document that I have a copy of is the one from May 5th.

DR. ZIEMER: Mine only had one attachment, but let me ask you this to make sure I understand it and maybe the table would be helpful. But, for example, let's take Plant 1. You would then have -- it appears for Plant 1 there would be like nine different strata. There would be the fluorimetry data for `51 to `67. Well, fluorimetry only goes through -- yes, it goes in `68 to `90. So there would be two strata there. Right?

DR. MAKHIJANI: Yes, that's correct.

DR. ZIEMER: And there would be for that same plant, in vivo counter data as

another strata for `69 through `90 and then there would also be a fecal sampling strata.

DR. MAKHIJANI: No, the fecal sampling, whatever is there in the worker records, we don't have any indication as to whether there was a particular plan for fecal sampling.

DR. ZIEMER: Okay. So that might not be.

DR. MAKHIJANI: So we're not stratified for that.

DR. ZIEMER: Okay. Then am I understanding what you're saying then and you would do the same for Plant 2. You would have a fluorimetry strata, an in vivo strata by years. Is that right?

DR. MAKHIJANI: No. I don't think so.

DR. ZIEMER: No.

DR. MAKHIJANI: We have it stratified by plant and period and because we know the kinds of work that were being done in

those plants then we can determine whether they should have been monitoring or not. For instance, there was thorium work going on in certain places and then if thorium workers were monitored there, then you know that you have the in vivo data.

DR. ZIEMER: Okay.

DR. MAKHIJANI: If you don't monitor in those plants. So the stratification is primarily by plant and period. It was only fluorimetrics. So it's only one stratification. Everybody who was sampled was sampled by fluorimetry until some later date.

DR. ZIEMER: Period, yes.

DR. MAKHIJANI: So no stratification is needed for that.

CHAIR CLAWSON: Arjun, this is Brad. I have that form that you've got and you know it's exactly saying exactly what Dr. Ziemer was saying and so forth like that. But the subpopulations where you have it pulled

out in Plant 1, Plants 2 and 3, and so forth and then like Plant 7 for 1954 to 1957. It came in two different separate, it came in the same e-mail, but two separate ones.

DR. MAKHIJANI: That's correct, Brad. I'm looking at the e-mail that I sent out on 9/4/2008 at Redondo Beach and it does have both documents attached to it. I can open the e-mail. So I think people may not have noticed that there were two documents attached.

CHAIR CLAWSON: Even if that's the case, this is Brad again, if we could --

DR. MAKHIJANI: I sent it to everyone.

CHAIR CLAWSON: Yes, I know. If there's any way that we can send that out because it does --

DR. MAKHIJANI: I can send it right now to everyone again.

CHAIR CLAWSON: Okay, because it does have exactly like what Dr. Ziemer was

saying and so forth like that. Because what I really liked in looking into this table is where you have like the millwrights, the mechanics, transportation and so forth kind of broken down in, I guess you would call that, a subpopulation or whether and so forth like that.

MS. BALDRIDGE: This is Sandra. Can I get a copy of that document as well or has it --

CHAIR CLAWSON: It has not been cleared for Privacy Act. I'm sorry, Sandra.

MS. BALDRIDGE: Okay.

CHAIR CLAWSON: But you understand our issues with the Privacy Act and so forth like that. We don't want to give out anything.

MS. BALDRIDGE: Yes, I do.

CHAIR CLAWSON: Okay. But I know that once this starts going through this and we'll be able to go through the Privacy Act and so forth they'll be able to -- as soon as

I get it and it's cleared, I'll be glad to send it to you.

MS. BALDRIDGE: That's fine. Thank you.

CHAIR CLAWSON: Okay.

MR. ROLFES: This is Mark Rolfes. Since I have a break in the discussion, I'd like to address something that Arjun said a few minutes back about the differences between enrichments and the effect on internal doses. That would be something that would affect internal dose if the enrichment was different because you would have a different specific activity.

For example, if you have depleted uranium that's roughly 400 picocuries per milligram versus natural uranium which is almost 700 picocuries per milligram, the effect on internal dose however when we complete a dose reconstruction we typically assume a chronic exposure for the individual's entire employment. We're not trying to do a

precise estimate of an individual's internal dose.

If we were doing a precise estimate, then enrichment information would be important. However, we are assigning internal exposures, chronic exposures, rather than fitted acute intakes and we are not trying to do in the great majority of cases a best estimate. We are trying to do a claim and favorable estimate so that we ensure that we have assigned the highest internal dose or a higher internal dose, excuse me, than what the individual likely received. If we have to recommend that a claim does not qualify for compensation, we want to make sure that we have overestimated the internal dose.

DR. MAKHIJANI: I don't see how you can overestimate the internal dose by underestimating the specific activity. I mean the amount of energy deposited directly proportional to the specific activity since you're assuming everything is U-234 you assign

the specific activity to the U-234 dose conversion factor. So if you're systematically underestimating the specific activity, you're going to be systematically underestimating the dose.

MR. ROLFES: Yet the intakes are substantially overestimated by assuming a chronic exposure.

DR. MAKHIJANI: In my opinion, you cannot balance specific activity by saying you're overestimating the intake. Then enrichment becomes irrelevant whether it's HEU or at what point do you draw the line?

CHAIR CLAWSON: This is Brad again. I hate to -- I think this will have to wait for some of these. My main concern is I want to be able to see what this sampling plan will basically get down to because there are issues on both sides. For one of the things I know that Idaho actually sent product out to Fernald that I know is a lot, lot higher enrichment than what we've been discussing

here today. They were used into a feed, but I believe that this would be better served at a face-to-face where we could sit down and look at a little bit of the data integrity.

So if we could kind of stay focused on this one, I don't know if it will be John or Arjun, but I'd like to be able to proceed on.

DR. MAKHIJANI: Brad, I think John and I are done. I just had a little bit of supplement to John just to say that we're also sampling the plan between the stratification with the plants and the stratification of the period. We should be able to discover the density frequency of thorium monitoring and then, of course, it will be up to you to decide whether that is adequate and what kind of co-worker model is needed or whether there's insufficient data and a feasibility discussion. But that's the only thing I had to add.

Harry's plan which I have again

sent out to everyone in the working group and Mark Rolfes.

MR. ROLFES: I did receive it, Arjun. Thank you.

DR. MAKHIJANI: Yes, I just sent it.

DR. MAURO: Arjun, could everyone open up the Table 1 in Harry's writeup? That's to me the essence of what we're talking about.

DR. MAKHIJANI: Table 1, let me just describe it to you for those who don't have it or maybe Harry can describe it. Harry, can you describe Table 1 in your writeup please?

MR. ROLFES: Excuse me. This is Mark Rolfes. Arjun, if we could just wait a second so that I can get this to our contractors as well?

DR. MAKHIJANI: Sure.

MR. ROLFES: So we are all looking at this. This is the first time we have seen

this document. We haven't had an opportunity to review it.

DR. ZIEMER: This is Ziemer. I just rechecked my May e-mail and we didn't get our document from Arjun actually. I think Brad --

DR. MAKHIJANI: Dr. Ziemer, this was not in May. The sampling plan I sent out at Redondo. My memorandum went out in May. The sampling plan was developed later internally as a result of that memorandum and I sent out Harry's document on November 4th.

DR. ZIEMER: Okay.

DR. MAKHIJANI: Or September 4th while we were at Redondo Beach because we had that working group meeting and nobody had the document. And so I sent it out then.

DR. ZIEMER: Okay.

MR. MORRIS: This is Robert Morris. Why don't we take a ten minute break so we can get the e-mails moved to the right place and open then up?

CHAIR CLAWSON: Sounds fine with me.

DR. ZIEMER: Do you want us to stay on the line?

CHAIR CLAWSON: That or mute it for just a minute and we can get everything and go back. But give me a chance also to be able to make sure because I sent out Arjun's back on May 5th to the rest of the work group. But he's right that these other documents came out in September.

DR. ZIEMER: The table wasn't with that May 5th one, yes.

CHAIR CLAWSON: Right, the May 5th one was just basically giving us kind of an outline of what they were sampling there.

DR. MAKHIJANI: That's correct. The numbers are in Harry's memo which I sent out in September and described at the working group meeting. I gave you all a briefing on what's in that memo then.

MR. ROLFES: This is Mark Rolfes

once again. I'm looking at this, and I haven't had the opportunity to even review this. This is the first time I've seen this document. I really can't even respond to the information that's contained within it. I don't know what the contents are.

DR. MAKHIJANI: It was prepared primarily for the working group to decide what size of completeness investigation, just as an FYI.

MR. ROLFES: Okay.

CHAIR CLAWSON: Yes, Mark. What this was prepared for us for, you know, we've been looking -- as you know, at any site, we have data integrity issues and so forth and one of the things that came up in Fernald and back and forth like that was a question of some of the sampling plans that they have and this is why this was prepared and what I've asked Arjun to do just so that you understand somewhat and I thought that I'd have you involved in this is basically give us a sample

of what the strata and so forth would be able to do and what they'd be able to cover because I'll be right honest with you, too. This is just giving us a basic outline of what they're proposing to us. They have not gone out and done a lot of this so far. But I want to be able to have some way to be able to check and come to a better resolution of data integrity and so forth.

If we do this or however we do this, it's not saying that this is exactly it or so forth. It's just giving us kind of a better feel for data integrity and so forth like that and this is what the sampling plan was for.

MR. MORRIS: This is Robert Morris. Let's go back to fundamentals on why you write a sampling plan. If you can't agree on what you're trying to sample for then you won't get the right answer and NIOSH has not had a chance to look at that. That is step one on any data quality objective process.

CHAIR CLAWSON: Okay. Let's get back to another one, too. Let's question data integrity. If we have no questions on data integrity, then that's a wonderful thing. We can accept everything there is. But if we have a question, so what are we supposed to do? Throw it all out and just say you can't do it?

MR. MORRIS: Have the conversation with all parties informed about what the objective of the sampling plan is. That is what EPA specifies in all data quality objective stuff and Harry can speak to that. DQO is the first step about what you want to find out.

DR. MAURO: This is John Mauro. This is unfortunate. I guess I was under the assumption that everyone had a chance to look at basically this, Harry's writeup, especially Table 1, whereby Table 1 of the strata. It basically lists the different time periods and the different plants and the different job

categories that we plan to sample from and also identifies the number of samples expressed in terms of worker years we'd like to pull. And our objective was if everyone felt that this was a good starting point, this is never the end of this. It's just the beginning of the process. If this was a good starting point in order to start the graph samples from this strata, we would start to collect the data regarding completeness. That is, how complete are the records for Plant 1? How complete are the records for millwrights in 1954 to `67? In 1968 to `90?

And I was hoping that out of this conversation we get a general sense that, yes, I guess this is a pretty good starting point and, by doing this, we would start to get a good sense of completeness and robustness. Can you do dose reconstruction with the data?

Unfortunately, it sounds like that NIOSH has not had a chance to look at this particular strata table and I agree with Mark.

It leaves it a little bit short to be able to -- See, what we're hoping to do is to collectively agree, yes, this looks like a pretty good idea, but let's make sure that everybody agrees it's a good idea before we go forward with it and start spending money and time. And if it turns out that right now SC&A, we, feel that, yes, this is a good place to start to fulfill the sampling needs for reviewing an SEC petition.

It sounds like though we would certainly benefit greatly if NIOSH could also feedback and let us know whether or not we are oversampling, whether or not there is some strata that probably need to be sampled that we didn't identify here. So I mean that was my objective of one of the things I was hoping to accomplish with this call.

DR. MAKHIJANI: It is kind of unfortunate. I sent it out to the working group right then, all the members of the working group, and I was focused on getting it

to them as they were, basically, the decision was how many numbers of claims we are to pull and how much work you want to assign and how much time and budget you want to assign to cover a task that you have said you want done and it was my understanding that that was the main thing.

Since the memo for stratification has been with the working group since May and I understood that from Mark and Brad that it was okay to go ahead and develop a plan that translated the strata into you have X-percent confidence in the results if you sample so many and Y-percent if you sample so many. And I saw the main object of Harry's memo as giving us a number and that the working group can decide what kind of resources it wants to devote to this.

CHAIR CLAWSON: That is correct. In your memorandum basically you're laying it out and it's like me and Mark said and unfortunately in Redondo Beach we didn't have

this information either. The thing was that before we put anything to it we wanted to SC&A was to prepare us kind of sampling plan of what they thought was going to work the best and so that we'd be able to make our decision from there. This was Brad.

This is basically what I'm coming to from what I'm hearing from NIOSH and their subcontractor that they want to be able to have time to be able to look at this and evaluate this more. Before we do anything more, is that correct, Mark?

MR. ROLFES: Yes, Brad. This is Mark Rolfes and I don't see how we can have any kind of meaningful scientific discussion without having reviewed the information that we're going to be discussing.

CHAIR CLAWSON: I know the feeling. I go through this quite often. You guys bring an awful lot of stuff to us. So I can understand wholeheartedly on this. But I guess one thing that I want to find out with

this call is to make sure that everybody has gotten both of these documents. You're a contractor yourself. It consists of two of them which was the memorandum and then that was also sent out, the sampling plan for the small Fernald completeness analysis that was prepared.

MR. ROLFES: Right. This is Mark Rolfes.

DR. MAURO: This is John Mauro. Let me say something to this. This is probably important. In the past when SC&A has been given a mandate to go forward with some action by the working group or by the Board we just moved so directly.

However, as a result of experience we've gained when it comes to sampling plans whereby we would be accessing all these records, one of the things we learned from the NTS site was it was a good idea to collaborate with NIOSH when we design and implement these sampling plans because they have so much

familiarity with the records and therefore their participation in Board's activities on this nature would probably add value as we did on the Nevada test site when we went forward with sampling certain strata and that work was completed. It was very useful to have feedback from NIOSH regarding the nature of the records in each strata and where it might work and where it may fail and why. Having that kind of insight helped us develop a more effective plan.

Normally, this is something that really that SC&A implements when the Board or the work group directs us. But in this case and I believe this to be true right now I think everyone would benefit by NIOSH looking at the strata, not so much the number of samples. The number of samples you collect from each strata is really a level of confidence that you would be able to make some statement regarding that information in that strata. But feedback from NIOSH would be

helpful in terms of whether or not their perspective on how -- we basically have 24 strata. Whether or not the way we've laid this out will be insightful in terms of once we go ahead and start pulling samples from these strata, that was the reason why I thought getting some kind of feedback from NIOSH would be helpful.

Anyway, whether or not we could hold off until we get some feedback from them on that, the way we've designed the strata or proceed at this point with starting to implement the program as we recommend, that's certainly the choice of the working group.

CHAIR CLAWSON: Well, I'll have to talk with the other working group members. But at this time we're trying to make sure that also NIOSH is happy, the petitioners are happy and so forth like that. But as you said with the Nevada test site, we need to make sure that we are sampling the right ones and so forth like that. So I guess I'd asked the

other Board members what their feelings are on this.

MR. PRESLEY: Brad.

CHAIR CLAWSON: Yes.

MR. PRESLEY: This is Bob Presley.

CHAIR CLAWSON: Yes.

MR. PRESLEY: As the chair of the NTS working group we had a sampling plan and a number of samples that SC&A looked at. On this thing, you're talking plant wide and 50 percent. I mean, I'd like to see this thing looked into a little bit closer. It sounds to me like that there's a possibility of three or four years of work here for somebody before we could ever say, yes, the information is good, bad or indifferent. So I'd like to see this sampling plan looked at a whole lot closer before we can come back and make a final decision on it.

DR. MAURO: This is John Mauro. What might be helpful is the number of strata that we've identified and the number of

samples per strata. Arjun, we made an estimate of the number of work hours per sample.

DR. MAKHIJANI: Right. I was just going to say that. This is quite unlike the Nevada test site in terms of the amount of work, Mr. Presley.

MR. PRESLEY: I think so.

DR. MAKHIJANI: The Nevada test site involves a lot of work for each record because we had to go into the raw DOE and contractor files for each worker. In this case, most of the work with some exceptions it's very simplified because things have been compiled into an electronic database.

We did a little sample run with the permission of Brad Clawson just to give you this information so you could make a decision. It thought about an hour or an hour and a half to compile the data for each worker and then you analyze it and sort it and do your analysis, but the data compilation here if we

do the, for instance, the smaller sampling plan of 275 workers, it would only be about a month and a half of person work, well, a month and a half or two months of person months of work. So we're certainly not talking years of work. We're talking a small number of months, not even one year.

DR. MAURO: Two people working for a month.

DR. MAKHIJANI: Yes. About that, I think is about right. That is what it will take to do this, maybe less.

MS. BALDRIDGE: This is Sandra. I do have a concern about the timeliness of this whole process. I'm not sure if you're hearing me or not if I've stayed on mute or -

CHAIR CLAWSON: We hear you.

MS. BALDRIDGE: At the October 24th meeting, Mr. Elliott announced that we would have a draft of a revision on part of the site profile and I was wondering if that's been received yet. He said three weeks from

October 24th and my inquiries have not come up with a positive response to the presentation of that draft yet.

MR. ROLFES: Sandra, this is Mark Rolfes. I would have to check the context of what he had indicated we would have. We have provided the working group with everything that we would use to reconstruct an individual's dose. These pieces of information are in white papers that would be incorporated into the Fernald technical basis documents.

MS. BALDRIDGE: My concern about this is because he also said that even with the addition of exposure data to an individual's claim that those claims would not be reconsidered and the additional dose would not applied until the entire site profile had been revised.

MR. ROLFES: That is correct. Once the site profile has been revised, a program evaluation report would be issued and NIOSH

would reconsider all claims where an individual had previously had a probability of causation equal to or less than, excuse me, less than 50 percent.

MS. BALDRIDGE: So my concern is if documents are expected to be presented for consideration and review by the Board in three weeks and they haven't been received in 10 months I think this is a real problem with timeliness being applied to the whole process, whether it be the SEC or the revision of site profile. So I don't know if that has been received at this point or has not, but possibly some of the Board members could check and see if they've received it.

CHAIR CLAWSON: Thank you, Sandra.

DR. MAURO: Brad, this is John Mauro. I think it's important for the work group and the Board to know that the plan that we've laid out here is designed to be completed in under 300 work hours and we would deliver it before the end of our contract. As

you know, our contracts will end December 1st.

So in effect where we are right now is we have a work plan. It has certain number of strata, certain number of samples, that we would pull from each strata and at the end of the process we'd be able to say something about the completeness of these strata and something about the completeness of -- and I guess you would say the adequacy of the data for doing dose reconstruction for workers in that strata.

Right now, our plan would be if we were so authorized to proceed we would finish up this paper study and it is a paper study going into the electronic database before December 1st and it would probably cost something on the order of under 300 work hours.

CHAIR CLAWSON: My understanding was it was going to be somewhere between 250 to 300 man hours.

DR. MAURO: Right.

CHAIR CLAWSON: And I understand wholeheartedly, John, and I guess this is -- and please accept my apology. I'm a little bit frustrated because this is the second time we've tried to get this data out and unfortunately we haven't gotten it out. So I understand some of Sandra's frustration myself, too, and I'm also a little bit frustrated because I understand when your contract is coming due and I wanted to be able to try to get something put into place if anything did change before that happened. But I also understand Mark's issue with being able to make sure because they've been working on this technical database and so forth.

So I guess my thing right now is I guess I need a consensus from the other working group members of what they would like to be able to proceed with and how they would like to be able to do it. So other Board members, if you could voice in on this, I would appreciate it because this is not my

decision to make. This is us as a working group to be able to make. Paul --

DR. ZIEMER: This is -- go ahead.

CHAIR CLAWSON: I was going to say I was going to start off with Dr. Ziemer.

DR. ZIEMER: Okay. I'm trying to understand the alternatives here because I just saw this for the first time. For some reason, I didn't get that earlier mailing at the time of the Redondo Beach meeting. But the 275 sample size alternative, does that correspond to -- how does that correspond to Table 2 or does it?

CHAIR CLAWSON: That would be one percent was my understanding. A sample size of 25 percent cell is required to achieve a level of precision and I guess, John --

MR. CHMELYNSKI: This is Harry Chmelynski. Maybe I should answer that.

CHAIR CLAWSON: Yes. Harry, why don't you take it?

MR. CHMELYNSKI: Since I made the

table. John Mauro gave a good background on what we're trying to do here. So the focus, there are just two numbers in this table. We should look at the annual column in the row that says plus or minus 20 percent, down at the bottom right portion of the table, and the way I interpret this is if indeed there was an annual testing program, then we would have a frequency of one test per year. And if we wanted to estimate something at the level of one per year we would need a sample of 25 work years. That would give us what I call a plus or minus 20 percent at one sigma or a plus or minus 39 percent for a 95 percent confidence interval.

DR. ZIEMER: Okay. I see that.

MR. CHMELYNSKI: That's how you read that one cell and all the rest of the cells are the same. As you go to the left of the table, it gets easier because the counts are higher for the monthly and the weekly testing. The easy way to think of this is

just think of radiation counts.

DR. ZIEMER: Yes. No, I'm just trying to -- I was trying to correlate the annual, monthly and weekly parts with what you had here and wasn't completely clear. I see now what you're saying.

MR. CHMELYNSKI: So to the extent that we talked about John's earlier discussion where he talked about 1,000 worker years in a population, if we were do this sampling plan, we would come up with a statement and let's say it really was the annual frequency testing. We would come up with a statement that, roughly we got 400. At a minimum we have 400 annual tests done out of 1,000, which would be enough to say that we have a good coverage there. So we could go much higher on here and try to estimate that one better, but we don't need to do that. We just have to make sure it's well away from zero.

DR. ZIEMER: Yes.

CHAIR CLAWSON: And if I could

interject something now, too, one of the things that I wanted to try to do and I don't think that I have succeeded in this is every one of the site profiles that we have into and getting and bringing up to this. We got into data integrity. We got into several things and as Mr. Presley says, at the Nevada test site, we have several of these issues and so forth and it was coming near the end of everything and what I was trying to do as I was trying to bring these issues up at the front of the work group and to be able to try to come to a question to be able to get this taken care of up front.

And I apologize, but it seems like this hasn't happened and a lot of this is because of trying to get information back and forth and that was my issue that I wanted to be able to do because data integrity and so forth like that is a big issue at every one of these sites. This is what I'm looking for for the work group to be able to do and what I

asked them to be able to do before we proceeded on with something and went from there, I wanted them to bring forth the information to us to be able to show us what the sampling plan would basically cover and how it would do it in these different strata as John portrayed and so forth like that.

And he basically gave us two options there and one of them was, I believe, the 250 and the other one was a little over 600.

DR. MAURO: Right.

CHAIR CLAWSON: He was saying that -- I believe you said that the 250 was somewhere between 250 to 300 man hours.

DR. MAURO: Right. In other words, a little over a work hour per case that we download and, in effect that would achieve a level of precision of 25 percent. Bottom line is what would I feel would work for the strata we've identified, the 24 strata that we've identified, the sampling plan that would be

designed to achieve the 25 percent level of precision. So, in effect, we're talking about a 250 to 300 worker years of sample and it would be about a little under 300 work hours.

We could put this off, the decision off, until a week. The way I see it is this. We will need two months to do this and deliver a draft report, paper study, on your shelf and that would bring us toward the end of November or December 1st and that will be fine. But if we put off beyond, let's say, early October we really would not be able to finish this up before the end of the contract. So maybe we could put this -- if you'd like, certainly we could sit tight for a week and surely it's only a few pages that NIOSH may want to take a look at.

And maybe we needed this discussion anyway to sort of get a little oriented. Now that we're sort of all on the same page you could see what we did and why we did it, take a look at the paperwork, there's a lot of

statistical analysis in here. But the bottom line is that we have 24 strata. We'd like to sample, in that 24 strata, a total of about 270 worker years of records and download that into a database and then be able to make some statements regarding the percent of completeness of each of the strata and say something about the robustness of the data itself in that strata and prepare a paper report.

We could sit tight a little bit, maybe sit for a week or so. Today is, what, the 15th. But we would need a decision by the beginning of next month or else we really can't do this work.

CHAIR CLAWSON: And I understand that, John, and this is a question to Ted there because basically as you know that any of these phone calls that we have or so forth or anything else like that are opened up to the public and so forth like that and I don't know if we have enough time to be able to get

that out on the -- to be able to make the proper notifications.

Now you're right that we don't have to do this, but the Board is always taking this thing as having everything open so that everybody can see what we're doing, you know, fairly serious and so forth like that. I do realize that we don't have to do that.

So this is my question. It comes down to something else, too. With NIOSH, and I'll ask Mark this, what do you feel that you need to be able to give us feedback on this paperwork or so forth?

MR. ROLFES: Well, we would certainly need time to first off read the document since we just received it and also formulate any kind of response, if necessary. Without knowing the content of the document, I would be hesitant to say exactly how much time it would take us. I'd have to take a look and I know that I am pretty booked for the rest of the month. So to have the

opportunity to review this and formulate a response, it's going to be a matter of weeks at least.

CHAIR CLAWSON: Okay. Ted, are you on the line?

MR. KATZ: Yes, I'm on the line.

CHAIR CLAWSON: Let me ask you this question. If we have to wait longer than we needed to on this for this contract and the contract changes or anything else like that, do we have a provision that we could still have SC&A give us a finished product or what do we need? I guess this is kind of my issue because I'm torn up with two different things, timeliness to the petitioners and I'm also tied up with the possibility of the contract change coming up in the year.

MR. KATZ: It would be nice to get this done within the time frame that we already have for the contract for sure because then things get dicey after that. But just some clarification from Mark would be helpful

because, Mark, you're saying that you're pretty busy. But you're not the only one, I would hope, that could possibly review this.

As far as your question, Brad, about how quickly could we reconstitute the work group by a phone meeting, I think we could do that pretty quickly. I mean we could get notice out on the -- again, we don't do a *Federal Register* notice. We just have to get the notice out on the web and through the listserv to the people who are interested in and Sandra is, of course, on the line. So she would know this is going on. So I think we could bring it back to work group pretty quickly for another phone meeting if that's the way we go.

CHAIR CLAWSON: Right. Well, you know what. We've gone into this on both sides and I understand Mark Rolfes' concerns about it because we've had work groups before when they've brought brand new information to us and then it's very hard for us.

I apologize. I thought that all of this had been sent out because I had received it and so forth like that. I guess I should have followed up and made sure that everybody had received it, or not. But I wonder to what extent I have to follow up on a lot of this information, too.

DR. MAKHIJANI: And I apologize, Brad. I sent it out to the working group in a hurry at Redondo Beach and I should have copied Mark and I didn't do it.

CHAIR CLAWSON: Well, the only thing that I can say that we can do with this work group here because I understand Mark's issue with this because we deal with this, too, and they have to be able to have an opportunity to be able to look at this strata and so forth like that and I guess -- I'm looking towards my other working group members to be able to give feedback to me of which way they'd like to be able to proceed with this, I guess. And I guess I'd like to start with Dr.

Ziemer and see what his opinions are.

DR. ZIEMER: Well, I think in principle I'd like to have SC&A proceed. I'm a little fuzzy, having seen this also for the first time in terms of the sample sizes and so on.

I think as I understand Table 2 that's pretty standard, just if you have the starting number how many samples you have. You can -- the precision numbers and the confidence intervals are pretty well set by the starting number. So I think those are probably all right.

I would like some assurance that we have the right strata and, do these 24 categories cover everything? Has anybody looked at that?

CHAIR CLAWSON: Well, I have because I kind of -- in the initial form of this, one of my issues was, are we sampling the right people and so forth and in this Table 1 where they have one portion of it as

each one of the plants and then like the millwrights and mechanics, maintenance, laundry and security and so forth like that. I couldn't see any other areas that they could really sample.

DR. ZIEMER: Do we know that those are the categories? I think, Arjun, you probably -- you looked at Fernald enough. Do their records sort by these titles?

DR. MAKHIJANI: Well, I actually haven't manipulated the electronic database. I think so. Harry actually did that while he was developing this. So Harry.

DR. ZIEMER: If millwrights is one of the strata, can we -- I just want some assurance that (1) we can locate these and (2) we haven't left anybody out and then I'm trying to get a feel for -- I think the 275 or 250 is kind of a minimum. I don't think that that is actually adequate. That's at a bare minimum to really answer the questions and I know, Harry or John, are we going to be in a

place -- after doing 275, are we going to be at point of saying, we can just barely answer the question?

DR. MAURO: There is 25 percent data. Harry, I don't know. I'll give my common sense answer. Harry, maybe you can give more of a statistical answer.

DR. ZIEMER: I know doing better is going to take longer. I don't want us to waste a lot of money and not be able to answer any questions.

DR. MAURO: When I look at it, I look at it from the point of view of a sampling program where we get 25 percent level of accuracy. What that means is when we're through and we see that we pull these samples and we can make a statement that our best estimate is that 50 percent of the workers are -- based on the sample, we can say in terms of completeness in that strata, 50 percent were sampled in terms of completeness and we can say that with an uncertainty of 25 percent

which means that we can be pretty confident, a high level of certainty, that at least 40 percent of the workers in that category, at least 40 percent, were sampled, if not more.

DR. ZIEMER: Yes.

DR. MAURO: And that's what we'd get out of the minimal case. That is the 250. I forget the exact number.

DR. MAKHIJANI: Two seventy-five.

DR. MAURO: Two seventy-five. It will give us at least 25 percent error. That's all it really means. It means that when we are done we're going to come up with an estimate of the percent of the workers that were sampled in that strata and we could say that with a 25 percent uncertainty which means on the low end. If it turned out to be we have 50 percent, we could say with a high degree of confidence well, at least it was 40 percent.

DR. ZIEMER: Yes.

DR. MAURO: Fifty percent is best

estimate and it may even be higher and that's what we would get. And in my mind, that ain't bad.

DR. ZIEMER: I think this probably is good enough for most of the categories. I just want to make sure that we reach a point where we're saying, we should have done it differently.

DR. MAKHIJANI: Maybe Harry ought to respond to Dr. Ziemer.

MR. CHMELYNSKI: Yes, I think that the -- first off, there was a question about the strata. I did get these by going through and taking a dump of the database and looking at the most frequent identifiable --

DR. ZIEMER: Okay. So these are the job categories sorted by what you're saying as --

MR. CHMELYNSKI: Yes.

DR. ZIEMER: Very good. Okay.

MR. CHMELYNSKI: Now not everybody has a plant and not everybody has a job

category and it's a lot messier than you think when you get into it.

DR. ZIEMER: Yes. Do you think this covers most of the people?

MR. CHMELYNSKI: Yes.

DR. ZIEMER: Okay. I just wanted to --

DR. MAKHIJANI: Dr. Ziemer, in practice, what I think is going to happen is because there are people who go from plant to plant and there are quite a few of them and because job designations change over time, the actual stratification in terms of job designations in plants are not going to be as dense as being able to give you the flat numbers, you know, how many worker years did people work or how many worker weeks did they work if they were on weekly monitoring or monthly and what proportion of the time were they monitored and how confident are we in that number. I think that's going to be the most firm number.

And that in a way allows you -- the most important determination is, among those, if you can identify those who had the greatest worker exposure potential, say, going by the frequency of monitoring for weekly monitored workers or monthly monitored workers, you're in reasonably good shape.

Now if the workers who were on weekly monitoring were being monitored weekly, then there may be a kind of different set of issues that arise. So I think the monitoring frequency result will be more robust than the job type results.

CHAIR CLAWSON: I have one question for Harry here if you don't mind me interrupting, Dr. Ziemer, and that's this PROD is that for production workers or what?

MR. CHMELYNSKI: I'm not sure.

CHAIR CLAWSON: That's Number 15.

MR. CHMELYNSKI: That's what the code was in the database and I couldn't find a good explanation for what it meant. That's

why I put a question mark on it.

DR. MAKHIJANI: PROD would be production.

MR. CHMELYNSKI: I assumed that but I couldn't verify it.

CHAIR CLAWSON: I just wanted to make sure because the only question I had on this that I was going to bring up is we have everybody in there except the actual production workers themselves. So I took it as that was being it.

Also what's this PLP down here that has an asterisk out by it? I didn't -that's just the plant labor pool. So that's going to --

MR. CHMELYNSKI: On several records, PLP were identified as plant labor pool.

CHAIR CLAWSON: Okay.

MR. CHMELYNSKI: Anywhere I saw that that's what I took it to be.

CHAIR CLAWSON: Okay. I just

wanted to make sure because in looking at this to me and understand what they have provided to you is exactly what I asked them to because one of our questions is, is that we wanted to be able to have a spectrum of different job categories and in a lot of these areas there's going to be a lot of different groups that are kind of going to be put under the maintenance program or so forth. There may be pipe fitters or whatever else like that. But that just falls under these categories.

I guess where I'm at now is what do we want to do. Do we want to postpone this or do we want to get them going? Because one of my issues is exactly like what Dr. Ziemer was saying. They gave me what their minimum of this would be for a sampling plan because I don't want to waste time. I don't want to waste money. But I need to be able to have a good feeling for what they have and it looks like what they've suggested to me I've been satisfied with and I'm happy with. But the

thing is I need to find out from the rest of the working group what you'd like to be able to do because to me this is basically just a generalized oversized sampling plan and one of my questions was okay, we get down the road here a ways and we come to find out that we have three or four groups that are not going to work and it's like John has explained to me. He says, if we get into this and when we get down the road and it has something that is calling out saying we have different issues in two of these strata or whatever we want to call them, he says then we can reevaluate from here. But this is going to give you a good starting point to where it will be able to give you a better feel for what the data integrity is on this.

And this was a whole bottom line of what -- and correct me if I'm wrong, John. But this is what our starting basis was for was to be able to perform this.

DR. MAURO: Yes, Brad. In fact,

this is not meant to be the be-all, end-all. The idea is we have to start somewhere and we used our judgment to this is how we dive in. It's not that. In my opinion, we can get an awful lot out of it at a relatively small cost, namely about 200 or 300 work hours in two months, and unfortunately the real world is until you dive into the data and start swimming in it and looking at it and holding it up and turning it around, you don't really learn exactly.

And you're right. It may turn out that we're going to find out a lot of things when we move through this process and we may have to shift direction a little bit and that will unfold in front of us. But in my mind, this is a very good place to start.

CHAIR CLAWSON: Excuse me. Dr. Ziemer, go ahead.

DR. ZIEMER: Well, the only other comment I was going to make, I think that in terms of Table 1, I think perhaps Mark's

people could evaluate that pretty quickly and see if they think the subpopulations or whatever the term is that's going to be used here are correct. I think Table 2 is a pretty much straight statistical table. It's the white marble/black marble in a bag kind of approach.

CHAIR CLAWSON: Dr. Ziemer, take it for what it's worth, but when this was sent out to me, basically I couldn't see any other areas because this is just a basic overview in Table 1 of the covered people. You know, we have the administrative people, the service people, and it gives an overall and there is going to be a lot of them that are going to be lumped into it.

DR. ZIEMER: Yes.

CHAIR CLAWSON: And I understand NIOSH. We're not expecting them to respond to this and say that this is all conclusive or anything else like this.

My personal feeling is, if we can

get started on this and be able to have this to be able to look at I think down the road, you know, after NIOSH would be able to look at what the results of this and so forth and out that they'd be able to say, maybe what we need to do is break this maybe Number 15 into some subgroups or something like that to be able to give us a better idea. I don't think this is the end of it.

DR. ZIEMER: I'm okay on that part and I think it would behoove us to move ahead on it. I think in fairness to NIOSH, like any other documents, we should allow them an opportunity to respond to this in the sense that, do they have any issues with how the jobs are categorized, do they have any issues with how one would actually sample this. You know NIOSH I think could also say, we don't think that's needed to do this because we believe our approach will cover all the folks anyway, and I think that would be a fair response as well.

But I think what we're trying to do is achieve and assure ourselves that there is not some subgroup in there that is not treated appropriately and if this helps us get at that answer then I think that's probably a good thing. But, in fairness, NIOSH has to have a chance, I think, to react to this and perhaps advise us if we are going to pursue this is there something we've missed. As Arjun said, they're more familiar with the database anyway and maybe they could help us streamline this in some way.

MR. ROLFES: Dr. Ziemer, this is Mark Rolfes. Yes, we would certainly appreciate the opportunity to both read and respond to this.

MR. PRESLEY: This is Bob Presley. I think it needs to be done. I've worked with sampling plans for the last 40 years and, as broad as this is and as small a number of samples that are going to be looked at, the chance of getting either high samples or low

samples are I think -- you know you can get those and that would really make this thing biased one way or the other. I would rather have somebody look at this thing and see if it's really something that's conclusive that we could use or not before we spend that kind of time and money.

CHAIR CLAWSON: And I'd agree with this, too. But also, this is Brad speaking again, if they come back with this and I would like them to be able to specifically say, if this will not work, how are we going to be able to bring this question to an end. This is part of the thing.

What I was trying to do with this sampling plan and I agree with you, Bob, I was trying to get the bare minimum bang for our buck to be able to bring some of these questions to an end and me and you have been on the Nevada Test Site and we've been trying to come to conclusions on an awful lot of stuff. But I do agree that NIOSH has to be

able to have the opportunity to go forth from there. I guess what are your feelings on it, Phil, and then we'll make a decision from there.

MR. ROLFES: Brad, this is Mark Rolfes.

CHAIR CLAWSON: Yes.

MR. ROLFES: If we could have maybe ten minutes for a comfort break, that would be much appreciated.

CHAIR CLAWSON: Okay.

MR. ROLFES: Is that okay with everyone?

CHAIR CLAWSON: That would be wonderful.

MR. ROLFES: Okay. I guess we'll stay on the line.

CHAIR CLAWSON: Yes, we'll just meet it and we'll come back in 10 minutes.

MR. ROLFES: Okay. Great. Thank you.

CHAIR CLAWSON: Off the record.

(Whereupon, the above-entitled matter went off the record at 12:06 p.m. and resumed at 12:17 p.m.)

CHAIR CLAWSON: Okay. Well, basically, I think where we last left off I guess we have to come to a conclusion of what we want to be able to do with this, if we're satisfied with what we've got and want to proceed with this or do we want to wait and hold off and if that's the case, how much time are we looking at. I guess I'm looking for the other Board members to be able to put their feelings in.

MR. PRESLEY: Brad, I'd like to see -- go ahead and have NIOSH look at this as quick as they possibly can and then if we can, go ahead and do the sampling. That way they have it sitting in the package in case there's an exchange in contractors.

CHAIR CLAWSON: Okay. Well, it's kind of a consensus in the respect that everybody --

DR. ZIEMER: This is Ziemer. I think that this is part of the ongoing and part of the closure package for the Fernald work. I believe that SC&A will have, possibly, some extension. John told us last time up through December to close out things in any event. Is that still okay, John?

DR. MAURO: Yes, we're good right up to December 1st and as I indicated, if we begin work on this next week or the week after, we'll still be okay and be able to deliver the report. So certainly we have a week or so where we could sort of sit tight until we hear back from any feedback from NIOSH.

DR. ZIEMER: But Mark said he might, this is Ziemer again, need a little more time than that.

DR. MAURO: Okay.

MR. ROLFES: That's correct. Like I said earlier, this is Mark Rolfes, I am pretty much booked for the rest of the month.

CHAIR CLAWSON: Okay. So basically I guess what I need from you is I need to get a tentative lead date of when do we think we could receive something.

MR. ROLFES: Well, I couldn't even guess. I don't know what's in the document yet. So I haven't had the opportunity to even review what has been sent. So I can try to get back to you in a couple of days to give you an idea of how long it will take for us to do something.

CHAIR CLAWSON: Okay. I guess if you could courtesy call the working group on that and the only thing that I can see that we can do is until we hear back from NIOSH and gives us basically a date, then we'll have to reconvene from there. We do have a Fernald work group scheduled for October 28th, I believe, coming up and so I hope it's before then but we can give the go-ahead or whatever.

But, Mark, if you could give us, the working group and so forth, a heads-up of

the time frame that you could request from us and look at that and if there are any areas that you feel that need to be changed or so forth like that. How would you like to proceed with this? Would you like to just get a conference call together again or just, what?

MR. KATZ: Brad, this is Ted Katz. Can I just interject here?

CHAIR CLAWSON: Sure.

MR. KATZ: Can I make just a suggestion that we -- why don't we book a conference call, try to book one, within the time frame that John Mauro specified, in other words, before the end of the month? If we could just book a conference call for an hour or two hours or what have you, that will give -- Mark will have a chance to look at this and see how much work it's really going to take for him and others in that team to develop a response and it may be that they find that it doesn't take that much and they will be able

to fit it in and we could get this done within time and not --

CHAIR CLAWSON: I guess, yes. I'm looking at the calendar and I'm wondering what would -- it's the 15th today and I'm looking at 26th is a Friday morning. That would kind of work best for me. That would give them two weeks. Could we tentatively shoot for that or do we have other people that have problems with that date?

MR. ROLFES: I may be conflicted the week of 21st through the 30th of September.

MR. PRESLEY: This is Bob Presley. I have a problem from the 25th, 26th or 24th, 25th, 26th. I'm already pre-committed those days.

CHAIR CLAWSON: Okay.

MR. PRESLEY: Now the next Monday, the 29th and the 30th, I'm free. I'm back at work.

MR. KATZ: Mark, was the 30th a possibility?

MR. ROLFES: I will be conflicted during that day.

MR. KATZ: Or October 1st?

MR. ROLFES: The 1st would likely be the earliest that I would be able to have a meaningful discussion unless it's possible, this is wishful thinking, that we could do something by the end of this week. However, I would be hesitant to offer that without having the opportunity to --

MR. KATZ: It may be that you're looking to -- you said you have a lot of work. But on the other hand, if you don't have a lot of work, then the 19th, does that work for other members of the work group?

CHAIR CLAWSON: What did you say now?

MR. KATZ: That would be this Friday. Mark's suggesting he might have -- be able to -- this Friday is the 19th of September.

CHAIR CLAWSON: That would be fine

with me.

MR. PRESLEY: This is Bob Presley. I'll try to be there.

DR. ZIEMER: We're talking about Friday morning, the 19th because I'm going to be on the road most of the day Friday, but maybe in the morning I might be okay.

CHAIR CLAWSON: I understand what we're trying to do here, Ted, but let me interject something here, too. If we -- is any of the working group that has a serious issue with this besides being able to allow NIOSH to be able to review it and so forth? Because one of my questions is if we're all fine with the sampling plan and want to proceed on and if NIOSH doesn't have a serious issue with it, why couldn't we just, with their recommendation back or so forth, if we got the consensus of the work group, could we not proceed on with the sampling plan?

MR. PRESLEY: This is Bob Presley. I have no problem with that, once NIOSH has

had a chance to look at it. If they okay it and say that we can, then I'll say let her rip.

CHAIR CLAWSON: Okay. What about you, Phil?

MR. SCHOFIELD: That sounds like a good idea to me.

CHAIR CLAWSON: Okay. Dr. Ziemer.

DR. ZIEMER: I didn't understand what Bob Presley said. If NIOSH says it's okay, then let her rip. I think you're saying to go ahead before NIOSH --

MR. PRESLEY: No.

CHAIR CLAWSON: What I'm saying, Dr. Ziemer, is if NIOSH doesn't have any serious issues or so forth like that or any serious changes or anything else like that. What I'm trying to do is get all the working group to be able to say yea or nay if they want to be able to go ahead, after NIOSH has had their opportunity to review it. If they don't have any serious issues, I see no reason

that we really have to do another Board call to find out the consensus with it.

DR. ZIEMER: If there are no issues, no. I'm okay with that.

CHAIR CLAWSON: Right. So I was trying to make this so we're not tying up so many different people's work. If that's all right with -- do you understand what I'm trying to say there, Ted?

MR. KATZ: Yes. No, that was actually an alternative I was going to spit out, exactly what you suggested. If that works, that seems fine.

CHAIR CLAWSON: Okay, and what I'd like to --

DR. ZIEMER: Excuse me.

CHAIR CLAWSON: I would just like to be able to get a consensus from you, from the members of the working group, because I have a message from Mark that he had a couple of little questions but they weren't anything serious with the sampling plan and he had no

problem with it. But if I could get the consensus from the rest of the work group, then we could just contend with me to be able to give the approval to be able to proceed on. But it comes down to NIOSH will still have the opportunity to be able to go through this and so forth. And if they do have some serious issues, then we could reschedule another conference call or whatever we needed to be able to do to have them bring up what their issues where and so forth.

MR. KATZ: Brad, this is Ted. And what we need then is we do need sort of date certain for when we will know from NIOSH whether they will have substantial issues or not or when they'll have a response so SC&A can go forward with benefit of whatever it is that they might have.

CHAIR CLAWSON: Right, and that's the thing. I guess I was going to give Mark as much opportunity. What I was looking at is if Mark was able to come back to us and say,

well, you know what? We've looked at this. We don't see any real big issues and so forth. There may be a need to be a tweak down the line, then we wouldn't have to go to get the whole work group back together and SC&A and so forth. We could just proceed from there.

What's NIOSH's feeling on this? I guess Mark.

MR. ROLFES: I can't commit us to anything without knowing what the document says unfortunately. Like I said, I will do my best to get back to you within two days and we will plan from there.

CHAIR CLAWSON: Okay. So, Ted, how do you feel we should proceed with this?

MR. KATZ: If we hear back from Mark in two days, that will give us a general sense of whether there are large issues or whether there is just tweaking and contributions to be made and, if it's the latter, then maybe in two days, we'll also get from Mark, I assume then, a date for when that

information will come. If they are big issues, then we'll know we'll need to book another work group meeting.

CHAIR CLAWSON: Okay.

MR. KATZ: We'll start on that as soon as we know.

CHAIR CLAWSON: Let me ask SC&A. Is that all right with you, John?

DR. MAURO: This is John. Yes, that's fine. We'll just sit tight for a few days and wait to hear back from you by the end of the week. I presume we don't do anything until we do hear back, though.

CHAIR CLAWSON: I would hold off until we hear back from NIOSH.

DR. MAURO: You would. So in effect we either will be given the green light to at least begin work by Friday or by Monday.

CHAIR CLAWSON: We can't guarantee that. That's up to NIOSH, what issues they have. If Friday or whatever Mark says, you know, we have real large issues or we need

more time, we'll just have to decide from there, John. I can't give you the green light until NIOSH has the opportunity to be able to have their responses and so forth.

DR. MAURO: No problem. We'll just sit tight and wait to hear back.

CHAIR CLAWSON: Okay. So I guess, Ted and other members of the working group and everybody that's on this phone call, my thing is that we're going to wait for NIOSH to be able to respond to it if possible as soon as they can. If they do get back to us in a few days and they have issues or they don't have issues, then we'll deem another working group and I'll send out an email going forth on that if that's all right with everybody.

MR. PRESLEY: Bob Presley. Sounds good to me.

CHAIR CLAWSON: Okay.

DR. ZIEMER: I'm good. This is Ziemer.

CHAIR CLAWSON: Okay. Phil.

MR. SCHOFIELD: That sounds good to me.

CHAIR CLAWSON: Okay. So I'll keep in contact with you, Ted, and, Mark, when you do get an opportunity to respond to us and so forth like that, I'll be waiting for your comments and I understand you can't comment or give us a date until you've had an opportunity to be able to look down at it and go from there.

MR. ROLFES: I'll make sure that I get everything that I can to you as soon as possible. I certainly do acknowledge that the timeliness issue is an important issue to NIOSH and also to members of the Advisory Board. I want to make sure that that's expressed, that we are trying to address things the best we can in a timely manner.

CHAIR CLAWSON: I understand. We get into this quite often and so forth.

Sandra, we'll try to keep you apprised of what's going on with this and let

you know what comes forth from this. Also, too, as soon as we do get a copy of this that has cleared the Privacy Act, we'll try to send you a copy of that, too.

MR. KATZ: One other question that I did have. It's more of an administrative thing. Do the Advisory Board members -- I know you have access to the O: drive to review documents. Do you have the ability to add documents to the O: drive?

CHAIR CLAWSON: No.

MR. KATZ: No, you don't.

CHAIR CLAWSON: No.

MR. KATZ: Okay. I was just going to possibly propose that as an alternate method, so that we ensure that everyone is getting the same documents for discussion for future working group meetings.

CHAIR CLAWSON: Okay. This is nothing critical but I still have a heck of a time with the O: drive. I get kicked out occasionally back and forth. It's kind of a

continuous thing going on there. So that one's kind of a hard one and I understand that.

MR. KATZ: This is Ted speaking. Certainly if people can provide me with documents we can get things on the O: drive. So please do. Whenever you want to use the O: drive, certainly provide the documents. I'll get those to OCAS and they can mount them on the O: drive and also just going forward, please if you have documents that a work group needs and all the related parties involved with the work group, if you would get them to me, I can also help make certain that everybody has these documents in advance and we don't run into this kind of sort of snafu at the last moment.

CHAIR CLAWSON: Okay. Well, I guess at this point we'll wait for NIOSH to respond to us and, are there any other questions that need to brought forth or anything that needs to be aired while we have

everybody on the phone?

John, do you understand kind of where we're going for sure?

DR. MAURO: Yes. Absolutely. I understand. We're just going to not take any actions until we hear back from you.

CHAIR CLAWSON: Okay.

MR. PRESLEY: I'll wait on your thing. This is Bob Presley.

CHAIR CLAWSON: Okay. But I want to make sure with the group that if NIOSH does respond to me and that they say they don't have any major issues with this that I'm given consensus as the working group chair to be able to authorize SC&A to be able to proceed on. Do any of you have a problem with that?

DR. ZIEMER: No objection. Ziemer.

MR. PRESLEY: Just let us know. This is Bob Presley. Just let us know what you're doing.

CHAIR CLAWSON: I'll send you a copy of the letters and so forth and also what

I send to John and so forth.

MR. PRESLEY: Thank you.

CHAIR CLAWSON: Okay?

DR. ZIEMER: Thank you.

MR. SCHOFIELD: Sounds good, Brad.

CHAIR CLAWSON: Okay. I guess that ends this Fernald work group. I appreciate everybody's participation. I apologize for the confusion that we had. I thought it was all taken care of before we got there and we'll just wait to hear and go from there if that's all right, Ted?

MR. KATZ: Right. Thank you, everybody.

CHAIR CLAWSON: We'll be ending this conference call then. Thank you.

(Whereupon, at 12:34 p.m., the above-entitled matter was concluded.)