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

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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
NTS (NEVADA TEST SITE) WORKGROUP

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WEDNESDAY, APRIL 23, 2009

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The workgroup convened in the Zurich Room of the Cincinnati Airport Marriott, Hebron, Kentucky at 9:30 a.m., Robert Presley, Chairman, presiding.

PRESENT:

ROBERT PRESLEY, Chairman
GEN ROESSLER, Member
BRAD CLAWSON, Member
WANDA MUNN, Member
PHILLIP SCHOFIELD, Member
MARK GRIFFON, ex officio

THEODORE M. KATZ, Acting Designated Federal Official

IDENTIFIED PARTICIPANTS:

JIM NETON, NIOSH ORAU
MARK ROLFES, NIOSH ORAU
ROBERT MORRIS, NIOSH ORAU
JENNIFER HOFF, NIOSH ORAU
MONICA HARRISON-MAPLES, NIOSH ORAU
GENE ROLLINS, NIOSH ORAU
BRYCE RICH, NIOSH ORAU
KARIN JESSEN, NIOSH ORAU
BILLY SMITH, NIOSH ORAU
NANCY ADAMS, Contractor to NIOSH
JOHN MAURO, SC&A
LYNN ANSPAUGH, SC&A
ARJUN MAKHIJANI, SC&A
BOB BARTON, SC&A
EMILY HOWELL, HHS
JASON BROEHM, CDC
JOHN FUNK, Petitioner

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

9:29 a.m.

MR. KATZ: Good morning, everybody. Good morning, everybody on the line as well. This is Advisory Board on Radiation Worker Health as the NTS Working Group and we're getting going here. We're going to begin as usual with the roll call, starting with board members in the room with the Chair. And in roll call please note your conflict of interest situation as well. Thank you.

CHAIRMAN PRESLEY: This is the NTS Working Group. Today is Thursday the 23rd. I'm Robert Presley, Chairman for the NTS Working Group.

MEMBER ROESSLER: Gen Roessler, member of the NTS Working Group. No conflict.

MEMBER SCHOFIELD: Phillip Schofield, Board Member. Working Group NTS. No conflict.

MEMBER MUNN: Wanda Munn, member

of the Working Group. No conflict.

MEMBER CLAWSON: Brad Clawson, member of the Working Group. No conflict.

MEMBER GRIFFON: And Mark Griffon. I'm not a member of the work group. I'm on the NIM, conflicted for -- with Bob Presley.

CHAIRMAN PRESLEY: Let me say that I'm not conflicted.

MR. KATZ: Thank you, Bob. And on the line, I just need to check. I assume we don't have any board members, but if there is a board member, please let us know.

Okay. That's good, because otherwise we'd be pressing a quorum here.

And now in the room, the NIOSH ORAU Team.

DR. NETON: Oh, I'm sorry. Jim Neton, NIOSH. Not conflicted at NTS.

MR. ROLFES: Mark Rolfes, NIOSH health physicist. No conflict of interest.

MR. MORRIS: Robert Morris, Oak Ridge Team, not conflicted.

MS. HOFF: Jennifer Hoff, ORAU Team, not conflicted.

MS. HARRISON-MAPLES: Monica Harrison-Maples, ORAU Team, not conflicted.

MR. KATZ: And on the line, do we have any NIOSH ORAU Team?

MR. ROLLINS: Gene Rollins, ORAU Team, not conflicted.

MR. RICH: Bryce Rich, ORAU Team. I have a --

MR. KATZ: I'm sorry, Bryce. We couldn't hear that. Do you have a conflict?

MR. RICH: I have a conflict.

MR. KATZ: Okay. Thank you.

MS. JESSEN: Karin Jessen, ORAU Team, not conflicted.

MR. KATZ: Okay. Is that Karin Johnson?

MS. JESSEN: Jessen.

MR. KATZ: Jessen? Thank you.

MR. SMITH: Billy Smith, ORAU Team, conflicted.

MR. KATZ: Thank you, Billy.

Okay. And in the room, SC&A, please?

DR. MAURO: John Mauro, SC&A, not conflicted.

DR. ANSPAUGH: Lynn Anspaugh, SC&A, conflicted.

MR. MAKHIJANI: Arjun Makhijani, SC&A, no conflict.

MR. KATZ: And on the line, SC&A, please?

MR. BARTON: Bob Barton, SC&A, no conflict.

MR. KATZ: Okay. And then --

CHAIRMAN PRESLEY: I think Emily's in --

MR. KATZ: Right. Right. Now --

MS. HOWELL: Emily Howell, HHS.

MR. KATZ: Are there other federal employees, HHS or otherwise? Emily Howell.

MS. ADAMS: Nancy Adams, NIOSH contractor.

Ted, I'm having difficulty hearing.

MR. KATZ: Well, Emily was in the doorway when she spoke.

MS. ADAMS: No, but even other folks on the line as you were going around the room.

MR. KATZ: This is Nancy Adams.

So you're having a hard time hearing me?

MS. ADAMS: Yes, you're really faint. I don't know if other folks on the line --

MR. KATZ: Well, I'm right in front of the mic.

MR. BROEHM: This is Jason Broehm, CDC Washington office. I'm hearing you guys loudly and clearly.

MS. ADAMS: Okay.

MR. KATZ: It's your phone, Nancy.

MS. ADAMS: I'll hang up and dial back in and see if I get a better --

MR. KATZ: I'm sorry. I'm teasing.

Okay. And then on the line, so we have Jason Broehm. Any other federal employees, HHS or otherwise?

Okay. And then now we go -- we don't have in the room anyone from the public or petitioners, but on the line do we have petitioners or anyone else from public who wants to identify themselves?

Okay. And on the line do we have any staff from Congressional offices who want to identify themselves?

Very good. Then let me just remind everyone on the line to please mute your phone except when you're addressing the Working Group. And if you don't have a mute button, use star-6. Please disconnect. Don't use your hold button at any time during the call.

And, Bob, it's all yours.

CHAIRMAN PRESLEY: Okay. The

agenda is going to be real simple today. We are going to start off with Mark Rolfes, CDC, going over our three items that we had that were outstanding at the last meeting. And after we complete that, then we want John to talk about his white paper.

I think we can still talk about that, is that correct, Emily?

MR. KATZ: Yes. Yes.

CHAIRMAN PRESLEY: The coworker model, we can talk about it?

MR. KATZ: Absolutely.

CHAIRMAN PRESLEY: Okay. I want to go through that. And then that'll be a pretty full day for us.

MR. KATZ: Let me just note for people on the phone, we have an SC&A paper, the coworker model that's currently proposed by NIOSH OCAS. And that is in the process of being Privacy Act-cleared, but I don't believe it's been cleared yet. Is that correct?

MS. HOWELL: My part is done.

MR. KATZ: Okay. But anyway, it hasn't been cleared and released. So I just want to let anyone from the public on the line know that that document's not available yet. When we have our discussions today, just everybody please be careful to stay away from any Privacy Act information when you discuss the document. Thanks.

CHAIRMAN PRESLEY: Okay. Mark?

MR. ROLFES: Okay. Thank you, Bob.

Just to make it short, there were three primary issues that we were looking into and we were asked by the Advisory Board Working Group Committee to do additional research into.

The first one was the removal of dosimetry badges by NCS workers. And we had done our own analysis at NIOSH to determine whether there were individuals that could have removed their dosimeters to avoid, for example, exceeding a radiation dose limit. We

looked at several cases, pulled access logs, dosimetry records and worker files to determine whether this process or practice did in fact occur. Everything that we were able to find indicated that this practice was not widely spread, if it did in fact occur. And we do have a method for those limited number of cases to assign missed doses or un-monitored doses during this un-monitored period.

Further, SC&A also selected several workers who indicated that they had removed their dosimeters. And of those individuals, they did the exact same thing as NIOSH, I believe, pulled records, looked through dosimetry files and interview records.

MR. MAKHIJANI: I don't know that that's --

MR. ROLFES: They had determined that nine of ten --

MR. MAKHIJANI: I don't know that that's accurate.

MR. ROLFES: Okay. Well, let me give my update please first and then I'll let you give your side.

So, nine of ten workers that were reviewed clearly showed that the practice probably did not occur while the other individual, the one out of ten individual, they found that it was inconclusive.

The second thing on the table that was in discussion was the re-suspension intake model for NTS. And there is some debate over how we are assigning ambient internal exposures to un-monitored workers in forward areas. And we had initially started off with an approved site profile and approved method in our ambient technical basis document. And SC&A had some comments on how those intakes were being calculated.

So we agreed to do some additional research, came up with a higher method, a method that resulted in higher internal doses due to higher intakes. However, both SC&A and

NIOSH felt that the method was too conservative. So we were asked to once again revise the method that was used to calculate intakes. So we pulled additional air monitoring records and used largely the air monitoring records to strengthen our basis for assigning ambient intakes.

There's also currently an approved method in the Nevada Test Site technical basis document to assign ambient intakes to un-monitored workers.

This third and probably the biggest of the three was the bioassay data that we are using to develop a coworker study to assign intakes to workers who were working in controlled areas and may not have been appropriately monitored.

We had proposed a method to bound internal doses to workers and the method that we used was by selecting the highest 100 externally exposed individuals. We felt that they would have higher potentials for internal

exposures. So all 100 of those high externally-exposed individuals that we pulled out of our record system, their bioassay data was evaluated to determine whether the information contained in their files would be sufficient for us to complete bounding dose reconstructions. We felt that it was, however, we also feel that if we are able to obtain additional bioassay data from DOE Nevada that that will strengthen our coworker model. And at this time we have not been able to obtain those additional bioassay data due to funding. So we have had some conference calls with DOE and we're hopefully going to be able to get some funding out to Nevada so that we can obtain some additional data.

So anyway, those are the three things that I believe have been in discussion and I guess we can open up the specific items for discussion and work from there. Thank you.

MR. MAKHIJANI: May I just make a

correction?

CHAIRMAN PRESLEY: Yes.

MR. MAKHIJANI: The ten cases that SC&A pulled, that report was given to you last year. They were not of the workers that SC&A interviewed. There are two separate tracks of the interview of the badging issue, as you know.

The ten cases were pulled from among the claimant files and then we compared the badge readings with the PICs and so on. And that's the report we're referring to, so those were not of the workers that were interviewed. That was for the 6367 period. The workers that were interviewed were primarily later workers who had stood up during a board meeting in Las Vegas and said they'd taken off their badges because they were afraid they would be damaged. It was not an issue of them being afraid they would exceed the dose limits. And those interviews were conducted in Las Vegas last year. And

that interview record has been submitted to you and the Working Group has elected, so far at least, not to follow up on the actual dose records and make any comparison with that. So it's actually very important to have the record accurate about that. Thank you.

DR. MAURO: I'd like to add one more item in the second area, the area dealing with environmental, just a minor point of clarification.

There was in fact a process maturity in terms of -- or on strategy for dealing with environmental exposures on flats to workers. And there was one approach that was under consideration; we call it the dust-loading approach, where NIOSH was going to assume that knowing the activity in soil throughout the site, and there's lots of data on that. The assumption is going to be made dust-loading that would be in the air where workers might be working would be five milligrams per cubic meter. It contained the

same activity with milligrams as is the soil under their feet.

Our reaction to that was extremely favorable. That is, that would be a very conservative bounding approach to presuming that someone's exposed continually. Certain people could be exposed to five milligrams per cubic period for short periods of time, it's very common, and continually. So quite frankly, we were at a point in that process where were certainly prepared to support that. But we also agree that that was a very conservative approach and we would represent a truly bounding strategy for dealing with that problem. But that problem was set aside, that approach was set aside for the approach that is now on the table based on air sampling data, collected I believe after 1970. And in our last meeting, we gave a report. In fact, Lynn Anspaugh took the lead on presenting our position and we have very, very serious problems with that strategy.

So as of this day we are at an impasse on that strategy. I don't know it can resolve in any way.

DR. NETON: Well, that's is what we talked at this --

DR. MAURO: Right. I just wanted to make sure we understood the process and where we are.

DR. NETON: Yes. This is something that we've been thinking about most recently. And there's market data and you just -- we've gone through this sort of evolutionary process of different models trying to bound what we consider ambient environmental. I think the disconnect arose at the last meeting, and I think I brought it up, that there's sort of a difference in my mind between ambient environmental, people who are sort of not necessarily doing active work, disturbing soil and that sort of thing, versus those who would be engaged in on-site sort of activities. And to that end, it would seem to

me that maybe a hybrid approach of these two models, one would be this ambient environmental model where we would apply that, as I suggested to those who were cafeteria workers, you know, sort of administrative workers not actively engaged in heavy labor, disturbing soils at least. And then possibly use this dust-loading model for workers who are working on various jobs about the site.

DR. MAURO: Oh, and that aspect of it, when we last closed, and you're refreshing my memory, we were discussing alternatives, an alternative strategy where you wouldn't be applying the air sampling data to everyone. You would parse that. But and I'm just saying, but I thought the way we left it was you were considering using the Table 7-1 approach.

DR. NETON: Approach to everyone, yes. I think there's a middle ground here, that's what I'm suggesting, is that rather than apply these coworker dosimetry models

that we're going to talk about later, which are for people who are I think engaged in -- people who are monitored have a much higher potential for exposure.

MR. ROLFES: People that performed re-entries --

DR. NETON: Re-entries and sort of thing. But to apply that seemed to me to be a little over the top. But to take the dust-loading models, you're outside and you're working, you're actively disturbing soil, to apply this previous model, it was really originally going to be just a pure environmental model, and now make it an outdoor-specific air model for workers.

DR. MAURO: So in effect, I mean you're going to that segment of the Flats, open area workers. You'd be returning to the five milligram per cubic meter strategy?

DR. NETON: It's a suggestion. I'm not saying we're going to do that, but I think it's open for suggestion.

DR. MAURO: My reaction to that is very favorable.

MR. FUNK: Excuse me. Could I make a comment here?

MR. KATZ: Welcome, John. Yes, absolutely. Go ahead.

MR. FUNK: Yes, I was assuming that we were on a level playing field here, that we would all have access to information. It appears that the working board has information that I don't have. Now I've talked to John Mauro and he told me that information would be forthcoming. I have not received it. So you people are working with information I haven't even had an opportunity to look at. I don't --

MR. KATZ: John. John, there is. As I think you maybe joined the call after the outset of the meeting, but I explained up front at the meeting there's only one document and it's not being discussed right now. We're really discussing documents that are from long

ago, I think, at this point, that you do have, like Dr. Anspaugh's review of the air sampling monitoring.

But there is one document that you don't have. SC&A has been working hard along with its NIOSH counterparts to PA-clear it. It's on the coworker model, but it hasn't been completely cleared yet. And again, we always strive to get these ready and available, particularly to petitioners and members of the public with an interest in advance of these Working Group meetings, but it's not always feasible to do that. And so you will receive that document as soon as it's through the PA clearance process, but as of this moment it still isn't completely finished, even though I think a lot of the work has been done. So I apologize for that, but that's the reality that lives with us with all of these Working Group meetings because we can't always complete these documents far enough in advance to get that work done.

Okay. You can continue the discussion.

DR. MAURO: No, it's good to get that behind us, because I think now we all agree on the state of the first two issues. And that would be the badge-left-behind issue and the ambient exposure issue. And now we can focus in on what I consider to be the only issue that's truly left that needs to be engaged, and it's a very important issue. It's almost the underpinning of the reconstruction of the internal doses as -- and a great of work was done.

Just by way of introduction before I turn it over to Arjun, we in effect put out a report last October on the subject of Table 7-1 of the evaluation report. I presume everyone around the table knows what I'm referring to when I say Table 7-1, which is the 100 workers that were selected by NIOSH to be the bioassay data which would be used as a basis to build an internal dosimetry coworker

model for workers at the Nevada Test Site post-1962. We issued a review of that report back in October, however, subsequent to that we got additional information that we felt was important and we issued a supplement to that report.

And that supplement, by the way, John, if you can hear me, is the report that was just referenced. That supplement, let me read it: It's called, "Addendum to the October 2008 SC&A Report: Evaluation of Internal Dosimetry Data Selected by NIOSH for the Use and the Development of a Coworker Model for Workers at the Nevada Test Site Post-1962." It is dated March 2009 on the cover page. And on the footers it's dated March 19, 2009. I believe this is going to be the primary subject of today's meeting.

CHAIRMAN PRESLEY: Correct.

DR. MAURO: And with that, I'd like to turn it over to the principal researchers and authors of that work, which is

Arjun and Lynn. But we did have a great deal of support from Bob Barton and Nicole Briggs. And I also was very much involved. So it was a large team that worked on this particular report. And it goes to the heart of adequacy. I'll call them the NIOSH 100 and Table 7-1.

But, Arjun, it's all yours.

CHAIRMAN PRESLEY: Before we go --

MR. FUNK: John, I'd like to make one comment before you go any further. Them 100 coworkers, I'm pretty fairly certain that they were all miners and they would not reflect on what took place in the Flats.

DR. MAURO: That's one of the subjects we'll be talking about. Because by the way, John, the information that you have forwarded to the work group, to NIOSH and the Board, was very much part of the genesis of how this supplement came about. So we'd like to thank you for providing the input that you have provided, because it is material that was important to us in preparing this addendum.

MR. FUNK: Well, thank you, John.

CHAIRMAN PRESLEY: This is Bob Presley. Before we go on, I want to make a statement that at this point we're going to be able to put the removal of badges to bed as an item, is that correct? Anybody have any more on that?

MR. ROLFES: The NIOSH position is that this issue is closed.

CHAIRMAN PRESLEY: Right. I wanted to make sure. And then the re-suspension tables?

MR. ROLFES: We did propose, you know, as Jim had stated, we proposed we'd consider considering both the mass loading model and air monitoring data to reconstruction ambient intakes from monitored workers and working in forward areas.

That's, you know, up ultimately to the Advisory Board or to SC&A to decide how the path forward goes.

MR. MAKHIJANI: Mr. Presley, just

on the badging question, just for the record so it's clear, for the workers that we interviewed mainly from the '80s and '90s, I think, we did conclude that there was a pattern of people -- their badges because they were afraid to damage. And there has been no further investigation at the election of the Working Group.

DR. MAURO: I'd like to add something to that, too. We also concluded based on that, the two pieces of work, the group of 10 workers that we looked at the badges plus these interviews, we did not find evidence, though there was clearly widespread practice of badges left behind, we do not believe that the -- the information that we found did not provide evidence that it could adversely affect the ability of NIOSH to perform dose reconstruction and build coworker models.

CHAIRMAN PRESLEY: Thank you very much, John. Appreciate that.

MEMBER CLAWSON: I do have one question though. Mark, you told us that the information that Mr. Funk has generated to us has been put in there and that it's been addressed onto the O: drive.

MR. ROLFES: That's correct.

MEMBER CLAWSON: Where is it? All I can find is the John Funk letter. I thought that there was something in there and I've been trying to find this file for quite a while now.

MR. ROLFES: Okay. There's a couple of matrices. They're PDF files. I believe there's two or three.

MEMBER CLAWSON: I'm not holding up the meeting for that. If you could find that for me, I've spent numerous times trying to find this and I just want to make sure --

MR. ROLFES: There's a lot of documents out there.

CHAIRMAN PRESLEY: Oh, I've got a hard copy. That's the only way I can keep up

with it.

MEMBER CLAWSON: Yes, I just wanted to make sure, because there was the job function letter and there was supposed to be a NIOSH response to the issues and so forth and I wanted to make sure that that was -- and I have been unable to find it. I found the letter itself, but that's it.

MR. ROLFES: I'll look while we're discussing.

MEMBER CLAWSON: Yes.

MR. ROLFES: And I'll see if I can find the location. I'll read it into the record for you.

MEMBER CLAWSON: Well, yes, if you'd just find that and then I'll find out where it's at.

CHAIRMAN PRESLEY: Okay. And then on the re-suspension, does anybody got any questions?

DR. ANSPAUGH: Just one comment. I'm very much in favor of what Dr. Neton

proposed as a hybrid approach. Personally, I think the documented approach available now is not adequate for all the reasons that were given in our report. So unfortunately, we don't have this hybrid model before us. So I don't think we can close the issue until we actually have such a hybrid approach before us.

DR. NETON: Well, it's not necessarily a hybrid model. It would be a use of two individual models depending upon the category of workers whose dose was being reconstructed.

DR. MAURO: In principle, recognizing that the actual methodology, what data sets they would use in terms of the area activity on surfaces, you know, and who you would assign what mix of airborne dust-loading. There's lots of fine structure to ultimately implement a coworker model along those lines, but this is an area that I'm very familiar with. And in principle, since we did

discuss this at length earlier, the concept and the approach, when it was being considered, I feel as if it was thoroughly vetted and the fundamental methodology that was outlined at that time was found to be favorably by SC&A. I am just operating on the assumption that that fundamental approach is basically the type of approach you're entertaining right now.

DR. NETON: It would be exactly that approach.

DR. MAURO: And so I feel confident we can say with a degree of confidence that certainly we would like a review from this issue. I think we have that -- you know, the work group would like to review it. The work group would like to review it and we certainly are available to review it, but based on the experience we've had in the past, I'm optimistic that that will work out favorably.

CHAIRMAN PRESLEY: And, Jim, if

it's acceptable with the Working Group, I would like to ask you to come up with a white paper, so to speak, or some kind of a -- and I know you all have a tremendous amount to do before we get to this meeting in Amarillo, but if you could come up with some type of a statement to the effect that this is the way that we're going to do business. Or if you come up with some reason that we can't do business this way, if you would let us know and then we can go back and discuss it some more.

MR. ROLFES: We do have Gene Rollins on the line and he's been very heavily involved in these calculations in developing this methodology.

Gene, is there anything you might have to add and does what we are discussing sound feasible to you and reasonable?

MR. ROLLINS: Yes, the model was under development and I brought the specifics to a meeting. And we discussed it and John

Mauro had some concerns that there was too much conservatism in it because I had put conservatism in every step of the calculation. And at that time, as I remember, I was given permission by Bob Presley to ask John Mauro to help me become more reasonable in some of these assumptions for the mass loading model.

CHAIRMAN PRESLEY: That's correct.

MR. ROLLINS: And that information was never forthcoming. That would be very helpful.

DR. MAURO: Gene, the information I can provide is I have quite a bit of literature and data on dust loadings from a wide variety of sources and different activities.

MR. ROLLINS: Well, that was only one of about four, as I remember --

MR. FUNK: Four or five.

MR. ROLLINS: -- significant conservatisms that were in my original calculations.

MR. FUNK: Correct.

DR. NETON: Well, I think those conservatisms might be okay given the population to which we're applying this model. That's what I'm suggesting. My recollection was that was the major issue that Dr. Anspaugh had, was applying this model to these work areas that were like essentially controlled areas outside, but they weren't adequately bounding for work activities. So, I think we're okay here.

DR. MAURO: I mean, if there's anything that I could do to provide you with information that I committed that I would provide, I will be glad to. I don't know what that is.

DR. NETON: Yes, let's let NIOSH, you know, get together, discuss this and we'll put out our --

DR. MAURO: Yes.

DR. NETON: -- a more refined approach here.

MR. FUNK: But the actual development of the model is complete. I just have to write it up. It could be done pretty quickly.

DR. NETON: Exactly. So I think we're okay with that.

CHAIRMAN PRESLEY: If you'll give me a copy of that, then we will get that distributed, Ted and I.

DR. NETON: In my mind, the major, the remaining issue then is to whom this model -- you know, how you triage the model. That's a judgment call that's made very often in this program as to who is the more -- who is an active worker versus who's an administrative worker, that sort of thing.

MR. FUNK: There's one more point here that I'd like to bring up, if I could. The supporting documents to the site profile, such as the test by name and date, they still have not identified the shaft tests that were shafts, drilled shafts and they still have not

identified those shafts that were mine shafts, which require the services of two entirely different operations, two different procedures. And there was a couple other supporting documents that haven't been --

MR. KATZ: John? John? John, can you -- I understand you have these issues. There not germane to what's being discussed at this moment though. If you could hold onto those until we get to issues of shafts and so on, that would be great.

MR. FUNK: Well, can I have my time to make my presentation?

MR. KATZ: Well, John, as I had discussed with you, you're welcome to when we're discussing matters that you have input, just as we do with other petitioners, you're welcome to provide your input at those points. But if you would just wait until we're addressing the issue that you have a concern about, that would be great.

MR. FUNK: I would believe that

this model though with its test by name and by date, if you don't identify, if you haven't properly identified what type of shafts they were. You're not --

MR. KATZ: John. John. John. John, the model that's being discussed at the moment is a sort of that ambient model being applied to workers. It's not germane to the population that you're concerned about right now.

I just had a question as to -- do you think that this work in developing this model to the extent that it can be presented can be done in time for the Amarillo update that's going to be on NTS or --

DR. NETON: I'm not sure.

MR. KATZ: Okay. I just --

DR. NETON: Probably not.

CHAIRMAN PRESLEY: What we can do -- Jim, that's right.

MR. KATZ: There's not much time.

CHAIRMAN PRESLEY: There's not a

whole to of time. It would be nice if they could do that and make this part of the update. Yes, if you can't, I would understand it and then we'll go on down the road at a later date. But if you can, it would be nice to have a presentation, some short presentation when we do this update to the Board on where NTS stands on this coworker model. I mean, not coworker model but the --

DR. NETON: So you're suggesting a presentation on our proposed approach?

CHAIRMAN PRESLEY: Yes, sir.

DR. NETON: To the full board?

CHAIRMAN PRESLEY: Yes, sir.

DR. NETON: Yes, we can certainly do that. I mean, I think I can do that whether we're 100 percent complete or not.

CHAIRMAN PRESLEY: Is that all right with the working group?

MEMBER CLAWSON: Yes, that's fine.

DR. NETON: And we'll do our best to try to get something out, but even if we

could distribute it to the working group, I sense there's not sufficient time for the working group to meet.

CHAIRMAN PRESLEY: Right. The chairman's going to be on the road.

DR. NETON: Yes, I'll be happy to provide a --

CHAIRMAN PRESLEY: Thank you, sir.

Okay. John, who do you want to kick off the coworker model discussion.

DR. MAURO: This is Arjun. Arjun is the principle author with Lynn and I'd like him to --

MR. MAKHIJANI: Yes, and as you know, John -- Bob Barton, are you on the phone?

MR. BARTON: Yes, I am, Arjun.

MR. MAKHIJANI: Okay. So, Bob really did a lot of the -- almost all of the data compilation, together with our team at SC&A. So, Bob, you know, please feel free to add things as I go along or at the end. I'm

going to try to keep it very brief so we can actually have a discussion.

Just to remind you, we did present this paper in October. I'll just summarize the main conclusions from that paper because this is a supplement to the earlier one. In that earlier paper, we found that monitoring frequency for internal dose was not correlated with external dose and there were inconsistencies, many inconsistencies in the bioassay results for gamma emitters and for plutonium, and there were very substantial questions about the quality of the data, if I remember correctly, until 1987, especially for gamma emitters and plutonium.

To the extent that the data can be considered reliable, radsafe personnel had the highest exposure potential for some radionuclides, but this is not demonstrated for all radionuclides. Although really when we did the supplemental report and did comparisons, we found it very difficult to

actually establish who has the highest exposure potential because other groups of workers have practically no data for many types of bioassay.

And that NIOSH statement that all 100 individuals identified as having significant external whole body photon exposures were monitored by bioassay during their employment. This is from the NIOSH evaluation report, that this statement was not correct for all 100 workers and all relevant categories of radionuclide. So that was from our analysis earlier on.

We did a supplemental analysis and Mr. Funk would be interested to know, as John Mauro pointed out, that there were concerns raised whether this group in Table 7-1 of the evaluation report was representative and especially of the workers in the Flats, rather than being predominantly representative of tunnel workers. And so there was a fair amount of investigation of the whole question

that was reopened at the time and I'll just go over our main findings.

We looked again at this question of external dose and were a little surprised to find that for the 75 workers with the highest cumulative external dose, more than half of that external dose had actually been incurred or received in the pre-1963 period, which is not relevant to the SEC period. So there can be no question of correlation of that, at least so far as we could see, with the internal dose received in the underground testing period starting in 1963. So the basis for compilation of that Table 7-1 is very much in question.

We also found that cumulative external exposure potential was not correlated with the highest values of bioassay data and the various bioassay categories. And just to remind what those were, those were plutonium, gamma, gross fission products and tritium.

DR. MAURO: And iodine.

MR. MAKHIJANI: And iodine. Thank you. Five categories. And within iodine actually there are sometimes subcategories.

And taken together, these findings from the earlier report and especially from this analysis, one of our principal conclusions is that NIOSH's selection criteria for cumulative external dose being indicative of the highest internal dose is not appropriate for the construction of an internal exposure model, a coworker model. So Table 7-1, we don't believe is an appropriate basis for a coworker model. And there's further evidence to that effect in the supplemental analysis.

As regard to the question of the representativeness of the workers, whether they were in the tunnels or the Flats, we did an analysis of that; and, Lynn, please amplify if you think it necessary, we did conclude that the tunnel workers were over-represented or the Flats workers were under-represented so

far as we could see. Now the --

(Off-mic comment.)

MR. MAKHIJANI: I'm sorry?

MR. ROLFES: I'm sorry. I was talking to Jim.

MR. MAKHIJANI: Yes, no problem. You can certainly amplify there some.

MR. ROLFES: Yes, that's true. Actually the majority of the radiation exposures did in fact occur in the tunnels rather than in the Flats.

MR. MAKHIJANI: Yes, that wasn't a question as to where the majority of the exposures occurred. I mean, the specific thing that is being asserted here in the conclusion was were the workers representative of the whole group of workers. And the question of who was most exposed is an interesting problem actually that arises out of this analysis.

DR. NETON: Over-represented.

MR. ROLFES: Right, we didn't

select --

MR. MAKHIJANI: The tunnel workers were over-represented.

MR. ROLFES: We didn't select the workers based on their job categories or their work location. We selected them based on highest external doses recorded, which would be indicative of the high internal potentials.

MR. MAKHIJANI: And that's right. And we have found that that criterion was inappropriate for several reasons. And so there are a number of layers at which the structure in Table 7-1, the selection of those 100 workers seems inappropriate for a coworker model.

Anyway, the idea that the tunnel workers were over-represented as compared to other workers was verified, and you agree to that, so whatever the reasons for that might be.

MR. ROLFES: Because that's where the highest radiation exposures are.

MR. MAKHIJANI: In examining who was monitored, we looked one more time at the Table 7-1 and radiation safety personnel were by far the dominant group that received bioassays and NIOSH has said its evaluation report that this is among the group with the highest exposure potential and therefore these can be a satisfactory basis. But we found that other groups of workers really had almost no data in most periods, and most likes of data. There are some exceptions and that's fine grain. It can be found in the report and I can go over it, if you would like.

CHAIRMAN PRESLEY: Arjun, do you recall what workers at this point had no exposure data?

MR. MAKHIJANI: Yes, most other groups of workers -- let me pull up the table, Mr. Presley. That was actually in our last report.

MR. BARTON: Arjun, I can find -- just to make a note here --

MR. MAKHIJANI: Yes. Yes, go ahead, Bob.

MR. BARTON: As far as what we've investigated, specific categories, in addition to rad safety, miners often had a semi-decent amount of bioassay. And then security personnel as well, particularly I believe in the later period, but I'm not completely certain on that.

MR. MAKHIJANI: Miners had bioassay data for tritium mainly. And security personnel had monitoring data for the 1980s. So as I was saying, there are some fine grain structure and some exceptions, but if you look at plutonium, for example, the non-health physics or radsafe categories or workers had very, very little monitoring data. Laborers, for instance, had very little monitoring data. Craft workers had little monitoring data.

DR. MAURO: Arjun, does Table 1 in our report, page 21 -- is that one of the

places where there might be an indication of -- I see a table; I'm looking at it. This is Table 1 on page 21. It sort of captures --

MR. MAKHIJANI: Yes.

DR. MAURO: -- at least some of this information. It's called "Summary of Work Locations and Bioassay Data of 100 Employees From Table 7-1." And I see a column saying whether or not there's any bioassay data.

MR. MAKHIJANI: Yes. That's right. Plutonium bioassay data.

DR. MAURO: This is only plutonium, right.

MR. MAKHIJANI: So you can see that most workers had no plutonium bioassay data.

MEMBER ROESSLER: That actually starts on page 19.

DR. MAURO: Okay. Thank you.

MR. ROLFES: Yes, the most likely element or isotope that you're going to be

exposed to at the Nevada Test Site would be a fission product though. So it would make sense that there's much more fission product data than there are plutonium bioassay data.

MR. MAKHIJANI: There's very little fission product data, too. I can go to our last report and actually give you the detail on that, but you have to bear with me because I have the --

MR. ROLFES: Miners obviously have a lot of tritium bioassay data because they were working in confined areas underground. And that's where the potential for tritium exposure existed.

MR. MAKHIJANI: Right. So far as fission product and gamma analysis is concerned, here is the summary of plutonium. We have all of these summaries in the last report, so I can actually tell them to you.

DR. NETON: For my edification because I'm probably not as up to speed on this as you guys all are, could I get sort of

an overview of the classes of worker we're talking about here? Are we talking about tunnels workers or are we talking about flats workers?

MR. MAKHIJANI: We didn't originally categorize them that way and none of the sampling is actually according to tunnel or flats workers.

DR. NETON: Right.

MR. MAKHIJANI: That was a separate investigation that was done, Jim, as a result of Mr. Funk's concerns about representativeness of the area in which workers worked and where most of the tests were. Maybe Lynn wants to amplify on that a little bit.

DR. ANSPAUGH: Well, I think the result of the analysis shows that of the more than 700 tests conducted at Nevada Test Site post-1962, 89 percent of them took place on the Flats. And if you look at the releases, the releases to the atmosphere also 89 percent

of the releases took place on the Flats.

DR, NETON: We're talking about venting of these tests, right?

CHAIRMAN PRESLEY: Yes, but 89 percent of the venting, how many vented?

MR. MAKHIJANI: Well, there were more than 200 vents.

DR. ANSPAUGH: There was 300-and-something. It was --

MR. MAKHIJANI: It's in the report.

DR. ANSPAUGH: It was a very large --

DR. NETON: I don't want to get too far into this. I just wanted to get a characterization in my mind what population --

MR. MAKHIJANI: Yes, we can tell you how many vented.

DR. NETON: Because we had just talked about this sort of dust-loading model to estimate dose and re-suspension of materials from work activity. But now I'm

hearing this other source term which is the venting possibly that needs to be added back into that exposure scenario.

DR. MAURO: In concept, it's clear that the 100 workers --

MR. MAKHIJANI: The number of events is 329 and it is in Figure 2 on page 11.

CHAIRMAN PRESLEY: Now, as I read this, when you say venting, is that somewhere where the airplane got a little bit of a sniff as it rolled across after the test, or is this something that was taken at ground level immediately after the shot? Or is there a report that says how many actual ventings took place that would have endangered the public?

MR. ROLFES: When the ventings occurred, were there workers in that place where the venting occurred, and we know there were not workers at the subsidence craters.

DR. ANSPAUGH: Well, in some cases there were workers at the subsidence craters.

In fact, sometimes workers were standing on top of it when it did subside.

But, Mr. Presley, the answer to your question is all of the above. The list which is given in the appendix is taken from a DOE report authored by Shoengold and DeMar, and one other person, which includes anything ranging from a controlled release up to a massive uncontrolled release, which would have been detected off-site even beyond the range of the country. So it includes everything. And captured in the appendix are the amount of material that vented. Sometimes it's a trace. Sometimes it's about 10 million curies. So, everything.

CHAIRMAN PRESLEY: But I want everybody to understand that this goes from a microcurie up to 10 million curies. And the amount of 10 million curies ventings were very, very low. Is that correct?

MR. MAKHIJANI: The large ventings, Mr. Presley, were between '63 and

the Baneberry venting in December 1970, with the exception of Mighty Oak in '86.

CHAIRMAN PRESLEY: Right.

MR. MAKHIJANI: And after 1971, with one exception -- well, Lynn should --

MR. ROLFES: Let me interject, please. When you're discussing a venting, typically that is not any actinides. It's typically radioiodines, other gaseous fission products such as xenon, rubidium, things like that that are volatile. Those are the things that are able to permeate through the ground and up through the cracks after a test is done. The actonizer typically either burned in the detonation or remained in the cavity. The gaseous materials are typically able to vent, but they are typically contained. When they are able to vent though, those typically do not present an internal exposure hazard for workers that are in the test site area. Those gaseous radionuclides are more likely to present an external dose hazard to people, and

they do quickly decay as well.

The people that would have potentially been exposed in those areas would have significant recorded external doses on their dosimetry. And that would be an indicator to us to say, well, they should have some bioassay data. They should have been monitored for internal exposures. If they've got a significant external dose, then those people should have been monitored. That would trigger us to look whether there are bioassay data. If there's not, then those would be the people that need to have a bioassay coworker -- excuse me, a coworker intake model applied to them. So, thank you.

DR. MAURO: I'd like to add on --

MR. FUNK: I'd like to point an error on this the point about post-1992 and pre-1992, if I could?

Post-1992 the test site, before the closed it up, had very little clean up except for the tower, picking up the metal and

then other objects around there. Since 1994, the whole entire Flats has been plowed and windrowed under. If there was no potential for a health hazard there, why did they spend all of them millions and millions of dollars going out there plowing the entire test site underground? And I believe there could be some confusion here of reports of exposure possibilities pre-1992 and post-1992. So I think that we should look further into this to find out where these figures we're working with, where they come from and what time period they came from. Thank you.

DR. MAURO: I did want to add one more item that's related to what John just indicated and Mark. The point you're making regarding ventings and noble gases and iodines, that's what comes out. We also have a section a report that points out though that there were historical safe tests where there were areas where there was plutonium. And it's those very same areas where the tests,

the shaft tests or the bore hole tests took place. So though the actual venting of a test might be as you described to a large extent, we can't forget about the fact that the ground under which that test took place very often had considerable plutonium and perhaps other radionuclides.

MR. ROLFES: Yes, that's very true. There are some isolated portions of the test site where there were some plutonium experiments conducted. And there were people that were involved in conducting reentries into those areas. Those people participated in a bioassay program to look specifically for plutonium. Some of them as well also had some significant external doses.

MR. FUNK: You're wrong about the flats worker. There was no bioassay --

MR. KATZ: John, please. John, please. Please, please, at least let a speaker speak.

MR. MAKHIJANI: Bob and Lynn, Bob

Barton and Lynn actually conducted quite a bit of investigation into this very question as to whether we could find significant plutonium data for workers who worked, who were identified as working in those areas.

Lynn, maybe you can go into that.

And Bob Barton who actually compiled the data could also explain our findings.

DR. ANSPAUGH: Well, there are several areas at Nevada Test Site that has significant plutonium contamination and this is indicated in our report. It was Area 5 where they did so called hydrodynamic tests. And also Area 9, which there was four non-nuclear explosions, three of which at least scattered plutonium to the extent that the name of the location became known as Plutonium Valley. I'm sorry, that was Area 11. And then Area 9 there were a lot of tests that were done before the 1962 period, but which caused substantial amounts of airborne

plutonium, as mentioned in NIOSH in your report as having the highest plutonium levels around, and that was in Area 9.

In our looking through the data on plutonium bioassays, it appeared to be that there was very little attention paid to the people who were working in those areas, although it's very difficult on the basis of the data we have to know exactly where somebody was at any particular day.

There were also, as I mentioned in this report and otherwise, there were plutonium experiments done in 1963 that were to the northwest of the site. Three of those tests had material detected off site and I think if material is detected off site, it probably also got throughout the test site.

Now another one of the issues that you mentioned was about how all the seeps were just little trivial amounts of radioiodine or noble gases. You know, in some cases that's absolutely true. There's no doubt about that.

MR. ROLFES: There are exceptions to everything.

DR. ANSPAUGH: In other cases there were massive events. In Baneberry, as an example, the manager was so upset about the result of that test he shut down the test site for about six months. And he set up a much more rigorous method of controlling these massive events, and I think that was largely successful after 1970. That was really the last major event that occurred at the Nevada Test Site.

So you have all kinds of different situations. You have people exposed to big events. And also I think the assumption that you have in a high external dose you have a high internal dose, is not true in a broad sense. For example, if you look at your Table 7-1 people, as near as I can tell the highest dose in there is 593 rem dose to the thyroid. This person did not have an unusually high external dose.

Another example that happened --

MR. ROLFES: But they did have external dose.

DR. ANSPAUGH: He did, yes.

MR. ROLFES: Yes.

DR. ANSPAUGH: But not unusually high.

MR. ROLFES: Well, the majority of the badge --

DR. ANSPAUGH: Well, let me finish.

MR. ROLFES: Okay. Go ahead.

DR. ANSPAUGH: And another event was the Merlin event, which was on the Flats in a person that had a fairly high dose to the thyroid. As I recall, it was maybe 20 rem and they had essentially an insignificant external dose. So I don't think that association is necessarily true. And certainly if you're out in the middle of a plutonium field, you're not going to have any external dose, but you could be kicking up dust that you inhale to get an

internal dose.

MR. ROLFES: Right.

DR. ANSPAUGH: So there's lots of exceptions to it.

MR. ROLFES: Yes, there are exceptions.

DR. ANSPAUGH: I think there are lots of exceptions.

DR. ROLFES: Sure. Well, I think for the kicking up dust, our think our mass loading re-suspension model will account for that appropriately.

For an individual that has internal dose, there are some exceptions, yes. There are some examples where people in the Plains that were doing sampling for the Plowshare experiments received some significant internal doses and significant external doses as well. We acknowledge that there are exceptions. We're not saying that there's never internal exposures. But what we're trying to do, we know that the majority

of the NTS work site, the majority of the individuals that work there did not receive any significant external doses. When we see an individual that did in fact receive an external dose, that triggers us. We know that that person could have had an internal exposure potential because they participated in a reentry, because they worked in a radiologically-controlled area.

MR. MAKHIJANI: A large part of this report actually goes to the investigation of that question.

DR. NETON: I'd like to speak a little bit about that.

MR. MAKHIJANI: Yes. And, for instance, the Areas 5, 9 and 11 that Lynn was talking about were specifically looked at. And pretty much the conclusion was the same as for other plutonium bioassays. Only the radsafe type of personnel have any real monitoring for plutonium. No other group of workers who had entered 5, 9 and 11 -- I think

there's only one sample from the Table 7-1 set for any other worker and he was in one of those areas for less than a week, at least so far as we could determine from the records.

DR. NETON: Okay.

MR. MAKHIJANI: So even in the high plutonium areas, only the radsafe type of personnel have this data.

And just to answer your earlier question about the exposure would be not to plutonium but to gross fission products, that's actually in our earlier report. If you look at the plutonium results, the numbers of bioassay and the gross fission product results in terms of bioassay, they're actually quite comparable. So Table 6 on page 30 of the October report shows that for laborers, welders, environment, there were almost no samples. Just two among the whole group for laborers from 1963 to 1967, and eight for miners, and none in the 1967 period.

If you look at --

MR. ROLFES: They were --

MR. MAKHIJANI: -- those are --

MR. ROLFES: -- radioactively-controlled areas.

MR. MAKHIJANI: Now these are the NIOSH people with the high exposure potential, so presumably we're only looking at people with high exposure potential and defined in the evaluation report. Now if you look at the distribution of gross fission product samples, which is on page 42 of the report, throughout the period laborers had zero gross fission product bioassay. Welders had zero, wiremen had one, and miners had 14. And so you can see this sampling. And then you have to analyze the periods. You know, you have to look at when there were ventings, when there was higher exposure potential. And the data are pretty sparse.

The bottom line on a lot of this stuff is the basis to compare radsafe workers for whom there are data to other groups of

workers and establish that radsafe workers were among the people with the highest exposure potential does not appear to exist.

MR. ROLFES: Well, workers weren't selected to participate in the bioassay program based upon their job title. It was based upon their job duties and work locations. That's the important thing that we have to remember.

DR. ANSPAUGH: I would take exception to that. I think the security people, for example, were deliberately picked to be monitored in the 1980s --

MR. ROLFES: Correct.

DR. ANSPAUGH: -- with the belief that they were canaries and would represent an early warning system. And in the early days, going back to '61 and '60, I think the miners were typically a focus of intensive monitoring because they had high exposure to tritium.

MR. ROLFES: Right.

DR. ANSPAUGH: But what happened

in '60 and '61, '62 is not necessarily a good model for what went on in post-1962.

MR. ROLFES: Okay. Yes, that's true. The guards did in fact participate in a routine bioassay program in the 1980s. And they would be indicative of individuals that were roving across the site. Their data would be useful to NIOSH as well for reconstructing internal exposures. The guards were typically controlling access to areas where there were radiologically-contaminated materials, soils where work was being done. I don't dispute that in any manner.

MR. FUNK: True, there was no guards on the four shot events. The guards left immediately after the shot was over. There was no guards there after that.

DR. ANSPAUGH: I think the fact is the guards had almost no external dose and almost no internal dose. And so in that sense, they weren't very good canaries.

MR. ROLFES: Well, I don't know

whether there's positive or non-positive bioassay data. You know, it's still bioassay data, whether we have a positive result or a non-positive. A non-positive result is equally as valuable to NIOSH as a positive.

MR. MAKHIJANI: It's only valuable in a coworker model if the group of workers is representative of those at the highest exposure potential. And what Mr. Presley or Dr. Anspaugh are saying is with the security guards in the '80s, that doesn't appear to be the case. And actually you wouldn't expect them to be the middle of the work in the radiological areas if they were simply guarding entry.

DR. NETON: Well, for the moment they're not in our model.

MR. MAKHIJANI: Yes. Right. So but then, you know, it's kind of either they are in the model or not in the model, but you hear both things. They're going to be used in the model or they're not going to be used in

the model.

MEMBER SCHOFIELD: Any time you're working in a area with loose contamination and you start walking around that area, you start moving equipment in that area, you can wind up very little or almost no external, but you can pick up one heck of a big dose in a hurry internally. And if you're not being monitored for that, there is no way they're going to know that.

DR. NETON: Well, I think that we proposed earlier to cover re-suspension of the material on site by taking the highest area of a contamination and developing some sort of a dust-loading of five milligrams per cubic meter, something of that nature.

DR. MAURO: I think that strategy goes a long way toward those workers who were not gaining access to controlled access areas.

DR. NETON: Correct. Exactly.

DR. MAURO: So I would agree that lots of problems have been resolved with the

approach you described. But what we're really talking about is known. We're areas where there was controlled access, which is a completely different exposure setting and scenario.

DR. NETON: Exactly.

DR. MAURO: And one of the things that I think really is the rock that you built your house on was selecting those 100 workers that had the highest cumulative gamma exposure. And the premise being, well, those are the ones. I don't want to lose site of that.

DR. NETON: Right.

DR. MAURO: And now I would like to ask, and I won't take the time, but I'd like you to go to page 44 on our report, you know, the supplemental report. Because we looked at that very carefully and listened. Was there any merit, any reason to believe that they; and that is, the 100 workers, whether there's any relationship between

cumulative gamma exposure and the results of the bioassay tests. And we looked at it for all the different radionuclides.

On page 44, if you have it in front of you --

DR. NETON: Yes, I see that.

DR. MAURO: It's a plot. On the Y axis is the maximum urine concentration observed for plutonium versus the cumulative gamma dose. It's a scatter graph. No relationship.

DR. NETON: Right. And let's talk about that a little bit.

DR. MAURO: Sure.

DR. NETON: I think first that we never indicated there was a direct linear correlation with gamma exposure and exposure to internal. I mean, we've never said that. We said that measuring external exposure is indicative of work in radiological areas. To have external exposure on your badge, you certainly had to be working in some kind of an

area where there was a source term. Okay? So that in and of itself was sort of our litmus test. The fact that there was a scattered gram here to me demonstrates that you've proven that there's very little really about the detection limit of the bioassay measurements. Many of these samples are at the detection limit or very close to the detection limit, so a priori, I think this is sort of a --

DR. MAURO: Misleading?

DR. NETON: -- misleading exercise. I mean, I think you could have done a much better job --

DR. MAURO: This happens with iodine. This happens with -- we've got places where --

DR. NETON: But what I'm saying though, it's most of the exposures at the Nevada Test Site were very low and not very large. So when you have a lot of data near the detection, when you have quite a bit of

dispersion about the detection limit as well as the biokenetic variability of the model which includes the GSBN 3, so you're --

DR. MAURO: Well, you're looking at five orders of magnitude. For five rem exposure, cumulative exposure, the concentrations are maximum.

DR. NETON: But remember --

DR. MAURO: These are maximum concentrations. Don't spread five orders of magnitude.

DR. NETON: We never said that there's a direct linear relationship between internal exposure to plutonium and gamma exposure. We never said that. We said that people who have gamma exposure worked in radiological areas where there were source terms. So they are more likely to have been exposed versus someone who had zero measured exposure externally.

MR. MAKHIJANI: There is quite a bit more than that. I'm just trying to find

the evaluation report.

DR. NETON: Well, whatever we said, I'm saying it now, and what I'm saying now I think is okay. I mean, I think this linear correlation thing is sort of a red herring. I mean, it's just --

MR. MAKHIJANI: Well, this comes directly from what you said in the evaluation report, that cumulative external exposure is indicative of internal exposure. It wasn't that external exposure is indicative of any exposure potential. And so --

DR. NETON: Well maybe that's a misinterpretation --

MR. MAKHIJANI: You chose the highest external exposure cumulative in order --

DR. NETON: -- those who were exposed to make sure we had some rad --

MR. MAKHIJANI: I'll find the --

DR. NETON: I think you're misinterpreting cumulative rad exposure, that

terminology.

DR. MAURO: But nonetheless, my point is though that those 100 -- there is no evidence that those 100 people represent the right group of people to build a coworker model on. In fact, the evidence seems to be overwhelming that the real place where people got internal exposures were at the Flats, and were different because of the incidents that we just described and --

MR. ROLFES: It's very unlikely.

DR. MAURO: And the exposures were included, as you correctly pointed out, venting of iodines, some sure were fission products, but also plutonium and other full out radionuclides for one group that was present.

Now, so we walk away from this and grabbed the wrong group of people. And I don't know how you go about finding the right group of people to group a coworker model on, and I don't know you can.

MR. MAKHIJANI: Well, just for the record, just let me read what's on page 35 of the evaluation report.

It says, "The nature of potential exposure scenarios at NTS makes it most likely that significant internal exposure would be associated with significant external exposure."

That's the reason you see all those charts, because that's what you said in the evaluation report and it wasn't borne out by actually trying to make this association.

DR. NETON: I think you've lost me on that interpretation.

MR. ROLFES: We did not say there was a direct correlation of the --

DR. NETON: We're saying those --

MR. MAKHIJANI: If there is no correlation, this statement cannot be sustained.

DR. NETON: There is no --

MR. MAKHIJANI: And all --

DR. NETON: Don't you believe that people who have radiological exposure are more -- or radiological workers who were exposed to a source term?

MR. MAKHIJANI: Well, then that's --

DR. NETON: In this section of the re-suspension of materials from -- this is the ground where there's plutonium-type materials.

DR. ANSPAUGH: Well, we have several cases where we have high thyroid doses with very little external.

DR. NETON: But there are external doses.

MR. ROLFES: That's very true. Then let me clarify that.

DR. ANSPAUGH: But let me just say one other comment, please. There's a serious problem here in the sense that we don't know what your coworker model is. You've only given a list of people in Table 7-1, that is one. And you haven't said how you're going to

develop a coworker model. That is a serious issue I think that clouds all of this.

DR. NETON: I will grant you that. Because then you could do some testing against the distribution itself. I'll grant you that.

DR. ANSPAUGH: So all of these things are surrogates for actually looking at your coworker model. Table 7-1 is really all we have.

MR. ROLFES: And we've agreed that we need to pursue additional bioassay. Maybe that's the bottom line. So this --

MR. MAKHIJANI: And moreover, if you look at the table, what we did in this report, just to kind of round out the finding of the report, is we compared whether -- just leaving aside the whole external/internal question, we compared whether the internal dose as indicated by bioassay results in Table 7-1 was indicative of the highest exposure potential in those categories, for instance. And radsafe was the category for which we have

the most exposure data and we found that the 20 that were selected at random for the SC&A examination presented in the last report of the 120 with six job categories, that the 20 radsafe worker category workers had much higher plutonium bioassay results than the NIOSH 100. So the NIOSH 100, by any criterion, is not the right set.

DR. MAURO: Go to page 40. Go to page 40. This is in my mind the single figure that we compare that really was very convincing to me. You folks have it in front of you. It's a graph. And what we're looking at is the distribution of the concentration of plutonium in urine. The blue dots represent the cumulative distribution of the concentration of plutonium in urine for the group of 100. Okay?

We said, well, you know, let's see if that how robust that is. So we went in and we randomly grabbed a group of 20, I believe it was, and just for assay partners, you know?

So let's go get our group of assay partners and plot that. And that's the red dots.

Now what this is says is that just going in and grabbing another set of people, another independent sample of 20 radsafe workers, we're finding that yes, those at the median overlap pretty nicely. But up at the 95th percentile our group is substantially higher. I think in fact they're fives?

MR. MAKHIJANI: Five or six.

DR. MAURO: Five or six times higher. So, I mean, this tells me that this -- and there really was no great heroic effort made. We just wanted to know, so let's go grab some and see what happens. And lo and behold, finding -- we just went in and grabbed a group of radsafe workers and their, 90 percent of them, concentrations in urine are six times higher than yours.

DR. NETON: You're saying that 20 samples occurred a lot more --

MR. MAKHIJANI: No, no. Twenty

workers.

DR. MAURO: Twenty workers. I'm sorry. Twenty workers. These here are 100 --

DR. NETON: But multiple samples?

DR. MAURO: Yes, that --

MR. MAKHIJANI: Yes, all of the results are represented in the last October report where we had 20 workers in each of six categories.

DR. NETON: But they had multiple samples, obviously.

MR. MAKHIJANI: Yes.

DR. MAURO: Absolutely.

MR. MORRIS: Please, can I jump in on a point here? You made a point that at the 95th percentile it's a factor of five higher. We don't do dose reconstructions in 95th percentile of the coworker model. We do dose reconstructions at the 84th percentile. What is the delta at that point?

DR. MAURO: Oh, no. Then that's actually at -- well, they're very close.

DR. NETON: Well, we need to be careful.

DR. MAURO: What we're saying is -- but it goes to show you that they're going to be -- using your coworker model, there are going to be workers, at least this -- I guess this is definitive proof, the doses will be underestimated.

DR. NETON: We need to be a little careful about that analysis, because we've observed when you have a small number of workers with multiple samples, that will skew your distribution tremendously. In other words, if you've got a few people in there that had an incident and they had six bioassay samples, they're all high --

DR. MAURO: Okay.

DR. NETON: -- it's not surprising that your 95th percentile is going to be up there.

DR. MAURO: You know something? I understand that.

DR. NETON: We're okay when we have like 10,000 data points and there's a few workers with multiple samples. We don't go bother to pull all those out. But when you have a very small set of workers, you have to be careful. I would suspect if you took the average or something of the samples for each worker and plotted the distribution, that would come out somewhat differently. But I'm suspect of that, that plot.

MR. ROLFES: Well also, John, can I ask something quick? What years? Are these the same years that you're comparing here?

MR. MAKHIJANI: Well, they're all '63 to '92 samples. And this is not differentiated.

DR. NETON: I'm wary of that analysis because --

DR. MAURO: Well, with the small numbers. In other words, you're saying that --

DR. NETON: Well, the small number

but many multiple samples per worker. Then you start skewing your -- you know, what's that representative --

DR. MAURO: Well, I mean, it was on the same level playing field as yours, though. You see, you had 100 workers.

DR. NETON: Yes. Yes.

DR. MAURO: We could have grabbed 100 also.

DR. NETON: Yes. Well, you're down --

DR. MAURO: And -- yes --

DR. NETON: -- less, but okay.

MR. MAKHIJANI: No, no. Wait a minute. We're comparing -- there are three different lines in this graph and two of them almost completely overlap, because --

DR. NETON: Maybe I'm not reading it properly.

MR. MAKHIJANI: -- because -- illustrating that none but those 20 had any plutonium samples. The black line is all 100

workers in Table 7-1.

DR. NETON: Right.

MR. MAKHIJANI: The blue line is the NIOSH radsafe in the Table 7-1, which was 21 workers. And they overlap completely because almost no one else had any positive -- you know, the --

DR. NETON: But the SC&A red line is 20 workers?

MR. MAKHIJANI: Twenty workers. So the blue line and the red line are comparing 20 workers to 21 workers. The object of this exercise is not to present something that could be useful for dose reconstruction --

DR. NETON: I understand.

MR. MAKHIJANI: -- but to show that a randomly selected group of 20 radsafe workers had at the right tail a significantly different set of plutonium bioassays, and tables have -- we went round this question from every -- there's not one angle from which

we looked at Table 7-1 and this was just one of the angles. And every way we looked at it reinforced the same central conclusion that that's not the right set.

MR. ROLFES: What this says to me is that if you add additional workers, it's going to drop down the internal doses that NIOSH assigns. By adding additional workers with internal exposures, it's going to drop. Is that not --

MR. MAKHIJANI: I think you're not getting the central point. There are a couple of central points. One is, if you look at your evaluation report, one piece I read out, the other piece, you say that radsafe workers are among the most highly exposed and therefore you can use those.

Now if you could establish that, I think you could have a data set that would be useful for a coworker model. From what we could look at, there's almost no useful data for other worker groups, so you can't

establish that. And so adding workers or adding radsafe workers doesn't actually relieve that problem.

DR. NETON: Let's cut to the chase here, I guess. The fact is when you're dealing with sparse data, you know, a lot things can pop up, right? I mean, you pull 20, we pull 20, you're going to get different distributions. And so I'll grant you that. And I think that we're willing to concede the fact that the data are fairly sparse and could be fleshed out in more detail. I think that's our position right now. And so if we need to go back, collect more data, we're prepared to do that.

DR. MAURO: You know, there's agreement around the table that that group of 100 that you currently have as the basis for your coworker model is right now not adequately supported --

DR. NETON: Well, it -- yes, it's --

DR. MAURO: -- and more work needs to be done to see in fact there are more data out there, better data, more complete that provides the assurance, then we're in agreement.

DR. NETON: Notwithstanding, I challenge some of the analyses that were done, and we have admittedly, but I think we're prepared to say that, you know, we based this on some sparse data, we need to flesh it out some more to be more convincing this is an appropriate value, or to substitute something else more. I think Mark might have had something to say as a --

MEMBER GRIFFON: I am debating whether to say it. I'm sorry. I'm debating whether to say it out loud. I mean, I just --

DR. NETON: I'd like to hear your opinions.

MEMBER GRIFFON: I heard Mark a couple times say "pursuing more data," and then that there is no coworker model yet. I'm

just a little -- I mean, I'm not in this work group, so I haven't been following it, I mean, is the work group model being developed from a database set of data, or are you pulling it from all the claims files, or --

DR. NETON: Well, originally it was developed from the 100, these radsafe workers who were --

MEMBER GRIFFON: So you took raw data out of their file and sort of assembled it?

DR. NETON: Right. It was a coworker model based on claimant data, not unlike what we proposed to do with Savannah River now where we would use the entire claimant population. In retrospect that might have been a better approach for us to pursue here.

MR. ROLFES: I think that's probably our next step would be to do that.

MEMBER GRIFFON: But when you -- you seem to suggest that there's some

additional data --

MR. ROLFES: That's another --

MEMBER GRIFFON: -- out there, too.

MR. ROLFES: Yes --

MEMBER GRIFFON: Okay.

MR. ROLFES: -- there are certainly are additional data at DOE Nevada that could be pursued.

MEMBER GRIFFON: So you know it exists and you know what they are --

MR. ROLFES: Yes.

MEMBER GRIFFON: -- you just can't get them yet? Is that what --

MR. ROLFES: Yes. The old system -- there's a couple of different databases that we spoke with some people from DOE Nevada about and it would take quite a bit of effort to find information in the database, then go recover microfilms and scan those and add those. So we're waiting to hear back from DOE Nevada on the availability of additional data.

MEMBER GRIFFON: That raises another question I have been asking people on the side, which is that, you know, I have that database, I think. It might not be the same one, but I have it from my research. And we also have microfiche. Boston University that has all the microfiche, but, you know, we did --

MR. ROLFES: Great.

MEMBER GRIFFON: It does exist, yes. It may not be the exact same set, but it does exist.

MR. ROLFES: We'd like to see that, I think.

DR. NETON: Could you provide a sense, Mark, of what the possible amount of data is that's out there, because I've been led to believe that it could be fairly substantial. We're not talking about a couple hundred workers here.

MR. ROLFES: Yes, let's see. I don't know -- Billy, are you on the phone?

MR. SMITH: Yes, I am.

MR. ROLFES: I know you've been working quite a bit and speaking about the availability of that data. I know you've been making several trips there as well and you've reviewed it firsthand. It's been a while since I've been there and spoken with anyone. Could you please give us an idea of the availability of the additional data from what we've heard in our discussions with DOE Nevada?

MR. SMITH: Well, I really can't tell you about the availability of it, but in terms of the volume of the data that's there, it has to deal with the --

MR. KATZ: I'm sorry, can you speak up, Billy, please?

MR. SMITH: I am. Can you hear me?

MR. KATZ: Yes, that's perfect.

CHAIRMAN PRESLEY: Thank you, Bill.

MR. SMITH: Okay. I really can't speak to the availability of it, but the volume of the data is enormous. As a matter of fact, there were tens of thousands of bioassay samples or results that are in the database that indicate that people were sampled. I think one of the flaws and fallacies of the SC&A analysis is that the results that they found have to do with only the bioassays that were positive, that were above the detection limit and they did not consider at all all of the negative results.

MR. MAKHIJANI: No, this is not correct. No, we compiled all the data that was there.

MR. SMITH: All of the data that was there. I mean, from --

MR. MAKHIJANI: In the raw data handwritten files.

DR. NETON: I think I can clarify. I think there's some concern or some lack of knowledge as to whether non-detectible

bioassay results were actually entered into the workers' records. I mean, we have some here --

MR. MAKHIJANI: Well, that's a different problem than what SC&A did.

DR. NETON: No, no. That's what I'm trying to clarify. I don't think it's anything that SC&A did.

MR. MAKHIJANI: Right. Thank you.

DR. NETON: I think it's the fact that there may be a lot of records out there that are non-detectible and did not show up in the workers' records. And we need to get to the bottom of that. Because we still believe it's a fairly lose dose potential across much of this site with the exception of some of these activities that we talked about, these unique operations that exist from time-to-time.

MEMBER GRIFFON: Just for Bill on the phone, do you know, does it have a database name or is there any other

descriptors? I'm curious if what I was working with is the same database. I'm not sure even --

MR. SMITH: Well, are you talking about the database that was sent back to University of Boston?

MEMBER GRIFFON: Yes.

MR. SMITH: It went back to Boston a few years back? Yes, that's a subset of the database in Nevada.

MEMBER GRIFFON: A subset? Oh, I see. Okay.

DR. NETON: And, I think we have to determine what type of subset that is.

MEMBER GRIFFON: Yes, I think the subset that Boston University got was because they were working under CPWR, so it was only the -- I think they queried the construction workers. Tunnel workers were in there, I know that.

MR. ROLFES: Specifically as to your question, Mark, the 1955 to 1963 database

was called dead bio.

PARTICIPANT: That's the same one.

MR. ROLFES: Okay. And then there is another database that points to the actual documents that are maintained on microfilm. The other database begins in 1964 and goes forward, and contains personnel identifiers such as the NTS member, the Social Security number and others. And the point of all that is that if a bioassay sample was not above the detection limit, it was not entered into the worker's dosimetry file. So what is in the worker's dosimetry file are the positives above detection limit. And it doesn't mean that there are no data there. In fact, it appears that there is a wealth of data and it's going to substantiate the very low coworker model.

DR. NETON: I mean, at the end of the day I think radsafe model is probably going to be higher than what we come with.

MEMBER GRIFFON: I mean, going by

memory, I know there was a large percentage of non-detects or whatever in all these data sets. But there was like -- and it sounds like the same one, but there was dead bio was '55 through '63 and then a mid bio. I think there were a number of these tables. You probably have the same exact -- sounds like the subset went to the Boston University.

CHAIRMAN PRESLEY: Hey, Billy?

MR. SMITH: Yes?

CHAIRMAN PRESLEY: This is Bob Presley. You going to be on here for a little while?

MR. SMITH: I'll be here all day.

CHAIRMAN PRESLEY: Okay. Good. I've got this old man syndrome and I'm getting ready to call a 10-minute break.

MR. SMITH: Okay.

CHAIRMAN PRESLEY: And we will come back at 10 minutes after 11:00. And one of the things that I would like to discuss is everybody says, well, we need new samples.

Let's go. Let's Gene and you and I come up with a list of people that will be potentially some of the highest -- people with the potential highest radiation dose.

MR. FUNK: Bob, can I inject something here at this juncture? Of all the tests that were conducted at Nevada Test Site that were underground, such as -- excuse me, I'd like to rephrase that. Of all the tests that were conducted in the tunnels and the mine shafts where miners took part, where bioassay was done, is less than one percent of all the tests that were done on the site. There was no bioassay for the Flats workers per se in the drilled shafts.

And I'd like to make another point. There was no -- the holes were not secured after the test was conducted. There was no longer any need for security to be there.

And another point, we were on theses sites where the test was carried out

for as long as two weeks before the so-called state of the art radsafe system was brought in where they put a fence around the reentry drill and where controlled access was done. And the controlled access was not done by Wackenhut. It was done by the radsafe personnel themselves. And these points needs to be addressed. And we're back to that table that has by name and date. We still have not identified which of them shafts were mine shafts which would have had bioassay and PICs and the shafts that were drilled shafts which did not have -- that type of monitor you're talking about.

CHAIRMAN PRESLEY: John, this is Bob. We're going to talk about that after the break. We're going to try to come up with a good list of people that we think might have the highest potential dose. Okay?

MR. FUNK: Can I help you?

CHAIRMAN PRESLEY: We will let you have your say.

MR. KATZ: Thank you, John.

So we're just going to put the phone on mute for about 10 minutes here, but we're not breaking the line.

(Whereupon, the proceedings went off the record at 10:57 a.m. and resumed at 11:23 a.m.)

MR. KATZ: This is the Advisory Board on Radiation Worker Health, the NTS Working Group and we're reconvening after a break.

And I just want to say something to John Funk.

John, are you with us on the line, before we get started?

MR. FUNK: Yes, I am.

MR. KATZ: Hi. Listen, my guess is that the Working Group is not going to go all day, that it's going to get done with reasonable time to spare.

And so, John, if you would just keep track, I mean, you've already raised some

issues and some things have been discussed, but, you know, no doubt you might have some issues at the end of all the discussion that you feel haven't been addressed that you would like to ask questions about and get responses from the Working Group. So if you would just keep track as this discussion goes on of which of your issues have been addressed but which more importantly haven't been addressed that you'd like to raise, then at the end of when the Working Group has gotten through all of its discussions, any of those outstanding issues, you know, if you would within five to ten minutes just raise those issues in as clear a fashion as you can one-by-one, and then the Working Group, some of the individuals from SC&A and the Working Group and so on can try to respond to those, if you'd like that opportunity.

MR. FUNK: That's perfectly acceptable to me. Unfortunately, I didn't have time enough to get this report into you

because I didn't receive any paperwork myself. So that's what's kind of messed this thing up. I wasn't aware of the time that I would have. So I'm sorry about this, but there has been quite a bit of injections of misinformation that I feel is kind of unfair because I didn't have participation in the process from the beginning.

MR. KATZ: Well, John, I mean, the Working Group normally, you know, has lots of dialogue and it's not just a completely open forum. But anyway, if you would just keep track of issues that you would like to raise questions about at the end based on the discussion that happens today or issues that you have from previously, then that would be great. We will hear those and people will take a crack at answering some of these questions for you.

MR. FUNK: That's fine with me.

MR. KATZ: Thank you, John.

CHAIRMAN PRESLEY: This is Bob

Presley. What I'm hearing, let me recap, is that we, the Working Group, and the Working Group chime in and tell me if I'm not correct, but I believe that we need to go back and try to identify some more people or job categories that NIOSH or CDC needs to look at to see if there are other groups of workers at the test site that might have either the potential or have a higher dose than some of these first 100 that we looked at. Is that not true?

MR. ROLFES: Well, what I think we committed to do was certainly obtain additional bioassay data. And I guess there's a couple of different sources. We already have bioassay data for all the claimants that we -- well, I shouldn't say all of the claimants. But every time we have a claim that comes to NIOSH for a dose reconstruction, we receive a response from the Department of Energy. And if there are bioassay data available for that individual, they are provided at that time. So that's one of our

first sources of data that we already have. There are additional bioassay data that exist that we do not yet have. And I think we've committed to looking into the other bioassay data to check on the quantities, the availability of those data, but we're also going to consider what we already have as well.

CHAIRMAN PRESLEY: Okay. Billy, you on?

MR. SMITH: Yes, I'm here.

CHAIRMAN PRESLEY: Okay. Gene and you and I, and see if I'm correct on this, I think that some of the higher potential dose rate would come from the people doing the drill-back and the receiving of the drill-back samples post-shot. Is that correct?

MR. SMITH: I can't confirm that those people would be the highest exposed people, but the source terms were there when they would recover core from the drill-backs and the people who operated the core shoe and

of course a radiation monitor was present at the particular time that the cores were being pulled and put into the containers for shipment back to the laboratories.

CHAIRMAN PRESLEY: That's correct.

MR. ROLFES: Now, as I understand as well, the people that would have been involved in taking custody of the core would have been from a laboratory, like the design laboratory at Livermore or Los Alamos and not necessarily NTS employees.

MR. SMITH: That's true.

CHAIRMAN PRESLEY: That's correct. And that would probably put a little bit of burden on whoever's going to go back and try to identify these people. But that is one group that I feel like has the potential.

The second group that I feel like that might have a higher potential would be the reentry teams that immediately went into the tunnels after the tunnel shots. Now take into mind that the people that went in there

were going in after the air was cleared. It's my understanding that as soon as we had the tunnel shot that the air was evacuated from the tunnel to try to get the gases out before these people went in. And if it's possible, we could identify some people that might have gone in where we did have a breach or a blow-back. That's possible that we could identify those people that would have been involved in that type of an operation.

The other potential would be the people that would have gone into the Plutonium Valley to go in and pick up samples at later dates.

What do you think, Billy?

MR. SMITH: Well, I don't think that the plutonium -- or whatever, it's not a lot of activity in Plutonium Valley. For those areas that were posted, no work really took place in those particular areas, so there was no samples to go back in and pick up.

CHAIRMAN PRESLEY: Okay.

MR. SMITH: The reentry teams are well-identified and we know exactly who the names of the individuals are that made the reentries, both for tunnels and for flat shots. And the log books indicate who those individuals are and of course by name, you know, so it is possible to go in and look at whatever dosimetry or bioassay information that would have been collected from them.

Now, the fact that a person made a reentry does not necessarily mean that a bioassay sample was collected. If there was a potential for a person to get an internal update, then a bioassay sample would have been taken. The fact that the guy was a radiation monitor on the team, he was already on the routine bioassay list. So he would have been getting a routine bioassay sample.

If there was an incident that involved the release of radioactive material where intake was possible, then people that were associated with that reentry team would

have been sampled. But now remember, all of the people that went back in on these particular tunnel reentries were in respirators of one kind or the other, either in self-contained respirators or as the time got later on, they might have gone to full-face respirators. But the potential for internal intake was very, very small.

CHAIRMAN PRESLEY: I agree.

Gene, do you have any comment on these areas, or do you have other areas where we might look?

Or, Billy, you too. If you've got any other areas that you feel like would have a higher potential for exposure to the workers.

Go ahead, Gene.

DR. ANSPAUGH: I wanted to make one comment about reentries. As you know, there were several different types of reentries that went on, and the very earliest one was sort of a survey for damage. And on

occasion I believe that the ventilation systems were damaged to the extent that some of the craftspeople had to go in and fix the ventilation system before it could be operated. And of course it's good to remember that the first concern with the reentry was explosive gases. And so there was no opportunity to be running air samples to look for radioiodine at that early reentry stage.

MR. ROLFES: True. True. But also keep in mind that because there are explosive and toxic gases in those tunnels that the individual would have had to have conducted a reentry using SCBA, self-contained breathing apparatus.

DR. MAURO: We're doing something now that I think is very important that I don't even recall every doing before. That is, not saying let's go and sample bioassay data and see what we have. We're saying something different. Let's visualize what took place at this site. All the different

types of reentries, different locations, different kinds of job categories and we'll say, listen, we're starting to get a sensibility of what scenarios, what work activities took place before, during and after a test where we could envision people could have experienced internal exposure. And I really thank you for this, Bob.

Then we ask the question, okay, given that sensibility, we're going to want to see if we can find bioassay samples for these people because we think these are the people that probably were the ones that had the exposures. We're approaching it in a different way. And if we can't find data for those people, we have to ask ourselves the question, or ask the record a question, why is it that these people that we thought on first principle should have been bioassayed, but weren't? And if we define the reason for that, great.

But if we can't find the reason

for that, it goes to the heart of what John's talking about. An awful lot of workers that were doing things and being exposed and were a potential for internal exposure where they weren't bioassayed for whatever reason. And that's my main concern. That's the main thing that came out of our work. That is, it seems to me there's an awful lot of categories of workers, especially out at the Flats, where bioassay samples weren't collected and perhaps, based on the discussions we heard from Lynn, perhaps they should have been bioassayed. And I think what you just described is exactly what needs to be done.

MR. ROLFES: John, I think on the break we were discussing a little bit about the -- I've got an example of a flat shot that was conducted at Nevada Test Site and there were additional reentries following, you know, an initial radiologically controlled -- however, there were also subsequent reentries when the area was declared as a non-

contaminated area. Basically, it was released from radiation safety and the people were not needed to participate in a bioassay program because there was no potential for intake.

We have swipe data. We have indications that really there was no internal intake potential. We've got, for example, this particular shot. We've got radiation dose rate readings and also swipe data. There were some people that did reenter into a containment area. There's also swipes inside of that containment area. There's also personnel contamination swipes to determine whether there was any contamination on those individuals. There was no contamination in this particular incident and if there was contamination on a person, that would indicate that that individual needed to provide a bioassay sample. If there's no contamination on an individual, it's very, very unlikely that they would have any intake potential.

DR. MAURO: So the point you're

making is that when we go through this exercise and we find certain people who my first thought was that, gee, we would have thought they might have been bioassayed because of what they did.

MR. ROLFES: Sure.

DR. MAURO: But you're saying that, no, but there's a record here that shows after that incident, that day, whatever it was, there were steps taken to take air samples or swipe samples, or do scan surveys that would indicate there was no potential. And the evidence being that the judgment not to take the bioassay sample for that person on that day is established and there's a record. And that would be the case that has to be made. Right now all we know is that we had all these people that worked at all these jobs and they weren't bioassayed. And but you're saying there might be good reason for it and there's a record for that, the reasons.

MR. ROLFES: Very true.

DR. MAURO: And now the story starts to unfold in a way that we can deal with it.

MR. SMITH: This is Billy. One of the things that you have to remember is that any time there was an event executed at the test site and after the reentries occurred, a controlled area was established around that area and that controlled area was really the area in which people were logged in and out of the area for radiological control purposes. They could have been issued PICs when they went in and came out, or they wore anti-Cs and they had the PPE that they needed to have to work in that particular area. People were not bioassayed at NTS based on job category, and that's a premise that you guys have made, John, that's absolutely wrong. So if you want to look at the bioassay sample from a particular carpenter group or a particular welding group, or a particular operating engineering group, you're not going to find

that that's the way bioassay sampling occurred.

Because of the very, very low potential of internal intakes at NTS, people were bioassay sampled based on need and if there was a particular incident that required them to be bioassay sampled.

MEMBER CLAWSON: So, Billy, this is Brad, you're telling me that NTS is so good at telling where contamination and everything else is at that they have done all these people by their requirements for that. Because if you are, I'm pretty excited about it. But I haven't seen it any place else. I know an awful lot of people, an awful lot of people that get into a lot of issues. And when you go into these reentries and you start breaking apart things that haven't been swiped and everything else like that, you have a very good risk of uptake. And you know as well as I do that they've had to go into many of these tunnels, put up lead, they've had to paint the

walls and everything else like that to be able to do this. So if they're not monitored, there's good potential for them to still get internal contamination.

MR. SMITH: Well, the radiation monitors would have been present. There was no activity that occurred in a radiological area at NTS where radiation monitors were not present.

MR. ROLFES: That's correct.

MEMBER CLAWSON: In theory --

MR. SMITH: No, not in theory. In practice. There was no radiological work going on at NTS where radiation monitors and RCTs were not present monitoring the workers to make sure that they were not exposed, either externally or internally to radioactive materials.

MR. ROLFES: I can read from an example of an event. After a shot was conducted, the very first thing, the very first -- two words: 'industrial hygiene' --

two industrial hygiene personnel checked the air to determine whether there were any explosive or toxic gases. So radiation dose rate readings and also swipes. They found no contamination for this specific -- and they were in Scott air packs. So they had protection equipment to do this initial reentry to determine whether there was any intake potential or high exposure rates. I mean, it is documented for each test and this is just an example.

For each time that individuals are going into the area, there is documentation of the contamination levels and dose rates that the workers were subject to.

There's also indicators whether or not there were any personnel being contaminated. There's indications that there was no contamination detected on personnel on this particular day. Now if there was an indication that there was contamination on those individuals, then it would be something

that would trigger the request for a bioassay sample.

MEMBER CLAWSON: How big were these tunnels, Mark?

MR. ROLFES: I am talking about on the Flats right now, so --

MEMBER CLAWSON: Okay. The Flats? Well, you know, let me explain something to you. In theory this all sounds wonderful. In theory I still can't do anything without radcon, but when you got one radcon and you've got 35 or 40 people doing work in one area, I'm sorry, you're not going to get it all and you're not going to be able to see everything that they're into. You've got people going every different direction. And this is what Mr. Funk has been bringing up so many times. It's not just so cut and dry. I keep hearing the comments of, we had radcon there, we had everything else. Well, read the RWPs very closely because it's just like with us, present. That doesn't mean they're there.

MR. ROLFES: well, I'm just reading the reports as they stand and it says no contamination was detected on personnel. So unless there was -- I mean, you know, I'm just reading the data. I'm reporting the facts. That's all.

MEMBER SCHOFIELD: But that's for one shot.

MR. RICH: This is Bryce Rich. Could I make a couple comments based on some little experience at the site?

MR. KATZ: Yes, Bryce.

MR. RICH: There are a number of ways of operating and controlling, and quite frankly, before a shot was executed, of course there's an evacuation of the entire area back to a major control point. A forward control point was set up for initial immediate reentry to retrieve diagnostics from the trailers that were around the test shot. In the event of a venting -- and by the way, this was controlled by the test group director, which was a

laboratory test group director, and we had a professional health physicist accompanying all of those initial reentry teams.

In the case of a venting, they wore appropriate respiratory equipment and sometimes it was, you know, a couple of miles to drive in order to get back to the trailer park. That was one area where potential exposure could occur. But there was somebody there with specific directions and responsibility for monitoring and detecting radiological materials and assuring if there was any potential for exposure, bioassay would be called for.

In the case after the subsidence, I think Lynn mentioned that occasionally, on rare occasions, I remember probably one where subsidence occurred after we were in the area or in the trailer park. It was extremely rare. We normally waited until the subsidence had occurred for safety reasons, because we didn't know exactly how far the subsidence

would occur.

In Alaska, you know, the subsidence crater was a mile wide or so, and indeed our control point was in the -- it dropped a few feet in the periphery of the subsidence crater. But when we moved in the drill rigs for -- and all of this was for sample recovery, prompt time electronic data recovery on the instrument trailers. And then of course there's a drill-back to recover the samples of the melt.

That was again done under control of the laboratory people with support from the site support contractor, the radsafe. The drillers of course were drilling and during this sample recovery, which were very high and a high potential for primarily radiation. These were melt samples and as a consequence they wouldn't -- a lot of air activity emitted, but they were properly clothed and protected. And in the event that there was any indication of release of activity, there

was bioassay samples taken.

Same thing was true with the tunnels. These were under the control, the initial reentries and particularly into areas where there was tunnel damage. And as Lynn mentioned, occasionally we'd have a vent line broken and indeed there was some high-hazard reentries where there's a possibility of explosive gases. And indeed, on rare occasions we had a detonation of gases in the tunnel. Happily, no one was injured from those, but there was a high level of safety and radiological safety, particularly awareness and if lines were available, the tunnel was ventilated prior to reentering. And those were vented through a stack with filtration on the effluent.

And the areas on the site, Plutonium Valley, for example, was roped off and it was -- most people were aware of that. Air sampling was taken on the periphery and so there was an environmental level of re-

suspension activity there. So there's data associated with providing safety for the site workers. From just my own perspective, I just wanted to add those things.

MEMBER CLAWSON: Well, Bryce, and that's good, and I'm not saying that they weren't protected. But you know as well I do stuff happens. From your knowledge with the chem plant, I'm sure that you're familiar with the term "the chem plant shuffle," and what that was for.

MR. RICH: Of course. And but we were very, very conservative, too, Brad.

MEMBER CLAWSON: We were, but that chem plant shuffle was to get what was off of our feet because the contamination on the ground.

MR. RICH: I understand. And we dealt with contamination and moving from the plant, and we solved the problem. But the point was, it was not an unknown issue. It was a condition that we were aware of. And

when we had contamination like that, we increased the level of bioassay sampling. The same thing happened at the test site. We don't have all of the data available to us now. A lot of data was taken that came out negative and my understanding from Billy was that they did not record in the same place the zero readings, but they are kept.

MR. SMITH: Brad, one other thing that I can add to what Bryce has already said, you know, once the reentries occurred and a control was established around a particular area, no, we did not have RCTs for every worker at the work site. But one of the other things we did, the layers of the radiological protection program, including air sampling -- for instance, air sampling was established as early as we could get the air sample established, either with electrical power or through the gasoline pumps and drove the air samplers.

If a particular air sampler had

shown that there was reasonable radioactive material suspended that the RCT had missed and after that air sample was counted, then an assessment would have been made as to whether or not the workers that had worked in that area had been potentially internally exposed.

So, you know, it was not a case where you decided that you needed to bioassay sample a person because of the work he was doing. It was because of what the radiation environment was in and around where all of the workers were working.

MR. RICH: And to reemphasize, Billy, there were certain classes of workers, however, that were on routine bioassay, specifically the radcon workers because they were at every site, every time.

CHAIRMAN PRESLEY: Okay. Gene, you got some? Lynn, I meant.

DR. ANSPAUGH: Well, I just wanted to comment that there 769 tests, and Mark was reading the results of one test. And if I

wanted to pick a horror story, I could pick the results for shot Yuma for example, or shot Merlin. And shot Yuma was, I think, if we think of the example of how all these procedures failed in the -- we had workers working who should have been wearing respirators who were not and the air sample wasn't counted until hours after it was taken. The decision was made to evacuate the people, but they -- the miners were already self-evacuating because they were all sick from carbon monoxide poisoning. So there's a full spectrum from very good to very bad.

MR. ROLFES: That's true. We're not saying --

MR. RICH: Lynn, this is Bryce again. Could I just make a footnote comment to your comment? You are highlighting the unusual occurrence, the incident. And indeed the standard operating procedure is replaced by an emergency procedure during that time. And in those occasions, of course there was

clear evidence and need for extensive bioassay sampling, which was done on every one of those shots, Lynn.

MR. ROLFES: That's correct, Bryce. I've seen a lot of the data. There's quite a bit of radioiodine data available for the individuals that participated in shot Yuma.

MEMBER CLAWSON: And, Bryce, I want to bring up something, too. Because you and Billy have been doing somewhat of the same thing. Unfortunately, we always look at one end of the spectrum and the other end of the spectrum. And I guess I'm trying to use a little bit of common sense. Everything was not always perfect there.

You have portrayed that everything was wonderful. And like Lynn said, he went clear to the other side. All I'm trying to bring to the point is is everything was not always wonderful down there and that there were mistakes that were made. And yes, that's

how we've made the radcon program what it is and we're still making mistakes.

You were talking about sampling early on. It's also true that those samples, as soon as the dust started going, they started filling up the samples and they wouldn't pull any more. So they were doing pre-samples of those and then they'd shut them off when the guys started working. I can tell you right now that we've already found that that is an issue and with our radcon program it has to be done during our work because we stir up so much different stuff.

I'm not saying that Nevada Test Site did anything wrong. What I'm trying to say is that we need to look at this also very realistically. Everything was not perfect down there. And we both go to either side of this and I guess I'm kind of a half-full or half-empty, whatever you want you say, but things were not always perfect and we did miss stuff, and we did miss people.

MR. RICH: I have never indicated that there wasn't things that happened out of the ordinary and that everything was perfect. Of course there was, otherwise we wouldn't have employed hundreds and hundreds of radsafe people and put the laboratory's -- put professional staff down there. We had 15 radiological safety people in the department that I was responsible for for a short period of time. And of course that's the reason why, because these were not usual testings. They were prone to -- that's why we conducted the test to see what would happen. So it was R&D of the highest hazard kind.

We understood that and indeed things happened. But my point was that when you establish a routine program, it is designed to provide coverage for an operation that is not changing radically. When you conduct a test, things happen.

And all I'm saying is that there was a radiological protection program and

could we have missed something? Of course we could have missed something, as you could miss something anywhere. But the effort was by looking at the total overall monitoring experience at the site, you can draw some very clear conclusions about the fact that you were looking at people with the highest potential exposure. And if you're concerned about any other individual, we always tried in this program to default to the high side and to provide the mechanism, the data to provide a dose reconstruction that is very claimant-favorable.

And so I'm not proposing, Brad, that everything was perfect. Of course it wasn't. But there was an awful lot of money and effort and dedication put into running a program that would provide every bit of safety that we possibly could to the worker and the plant population.

DR. NETON: I think this is all very good interesting discussion about the

historical perspective of what the monitoring programs looked like. But I think that the real issue at hand then is can NIOSH find sufficient documentation that the programs were as robust as portrayed here, and right now we're in the process of trying to determine how we're going to do that. And I think we've proposed a path forward to go look at this bioassay database that exists out there. And I think we're still interested in hearing some guidance from the Working Group and others as to which particular classes of workers might be of relevance or of interest for us to pursue.

MEMBER CLAWSON: And I guess that's part of my question. Are we looking at just the reentry teams into the drill shots or the tunnels, or everything?

CHAIRMAN PRESLEY: Everything. Because this is just an outline of where the potential might be. So you're looking at what went on. All the groups go into those things.

MEMBER CLAWSON: Well, the reason I'm saying that is because the tunnels, it was interesting to me because when they called them "tunnel workers," we had everything from electricians, we had mechanics, we have almost everything in there. And it was interesting to me to see that they were classified a lot of times as tunnel workers. And as I've heard from some of the petitioners and so forth, they moved in and out of that numerous times. And this is what I want to be able to -- what I'm looking at is because a lot of times when they went back into those tunnels, yes radcon went in there, but a lot of times they had to put the ventilation systems back together. They had to put wiring systems in there. Mechanics have to shore up or whoever went in there to shore the rocks back up and stuff. And I want to make sure that we get the right mix that we did. I know that we've looked at radsafe, but I want to look at some of the other ones, maybe even electricians and stuff.

But part of the issue, and this is what it gets into, they went in and out. If they were short electricians, they could pull them in from their central area and be able to use them on that. And if they gained manpower, they got the manpower. So this is what I was just suggesting.

DR. MAURO: And I'd like to remind, one of the first points that were made is that the tunnels is not where the action is. Only a small percentage of the tests took place in tunnels. Most of them were in bore holes and shafts. And I think that if we're going to go look for places -- I mean, you know, we've been looking at the tunnels and looking at the records that have emerged, and that's where the 100 fundamentally came from.

It's almost like a change of -- let's think about this a little differently. Since over 90 percent of the tests took place in the Flats, and it sounded like a lot of the releases took place in the Flats, that's the

place we should be saying, okay, where are the people, where are the scenarios where we're sure -- would like to be sure that if there were no bioassay samples taken from those workers that participated in those tests, it was good reason for it. My main concern is that if we just look at the bioassay data without mapping it back onto the scenarios and settings, especially in the Flats, we're going to come back here and again and we're going to be right back where we started. So I just want to remind everybody of that.

MR. SMITH: Brad, this is Billy.

MEMBER CLAWSON: Hey, Billy.

MR. SMITH: I'd like to comment. I agree with you that, you know, the term "tunnel worker" is a generic term. That's a term just simply applied to people who work in and out of the tunnels. The job categories covered the whole spectra of construction and maintenance worker categories. And those people who worked on a particular crew, if

they were short and they needed some other people, they would get other craftsmen in to support the work activities that went on in the tunnels, as compared to people who worked in the Flats. Now there were drillers and there were miners. All right. Drillers primarily worked in the Flats drilling the vertical shafts and the vertical holes. The miners did the mining up in Area 12, 15, 16 and 20 Areas. Those were just categories of workers based on the kinds of jobs that they did.

And the kind of protection programs that went on to look at workers by DOE was to protect all of these people doing whatever they were doing with an adequate radiological protection program, a layered radiological protection program which included a variety of people with dosimeters, collecting air samples, putting out environmental surveillance networks, and also looking at the activities that were going on

that were associated with creating contamination, if you will.

I would suspect that, you know, with the kind of work that I know that Lynn did at the test site in Area 3, in Area 5, in Area 9, the "Plutonium Valley" areas, if you're familiar is true, then you are sitting there looking at the person with the highest potential internal exposures. Lynn worked in that area. That's what he did.

DR. ANSPAUGH: Thank you, Billy, but I'd remind you I never had a bioassay.

MR. SMITH: And that's indicative of how good the program was. You didn't need --

MEMBER CLAWSON: Billy, that's a loaded one there, but let's get back to the issue at hand. Here's one of my things. If we're looking at the Flats and everything else like that, what sorts of people would we have in there? Because I know when they came in to take the trailers out and everything else like

that, we had operating engineers in there. Was it the electricians that were cutting the wires that went down to the test, or was it the instrument people? What kind of people would be looking for?

MR. SMITH: There were all types of craftsmen in. I mean, there were electricians, there were teamsters, there were operating engineers.

MR. RICH: Some of everything.

CHAIRMAN PRESLEY: I agree. And, Billy, you brought up a subject about drilling in the Flats. And John has brought up a subject about miners that worked in the Flats. This gives me a chance to clear something up, and you all stop me if I'm wrong. We did have shafts in the Flats where we used miners. And what we did is we drilled a shaft first and then the miners went down and they made large rooms and tunnels at the ends of these shafts. And so, yes, we did use miners in the Flats, but at that time the miners that would have

done the work in the Flats would have been pre-shot-type people.

MR. RICH: Bob, this is Bryce. Just a little additional clarification.

CHAIRMAN PRESLEY: All right.

MR. RICH: When the access to below ground in the Flats was done with the standard mining drift, it was dug out rather than drilling.

CHAIRMAN PRESLEY: Right.

MR. RICH: Sometimes on a number of occasions, you're right, we drilled and cased a large casing and then the miners went down and cut and excavated underground from that casing. But there were instances where the miners would have sunk the shaft that provided the access to underground.

CHAIRMAN PRESLEY: Okay. Thank you. The only thing, I'd already written down in a case shaft to the rooms downstairs.

MR. SMITH: You know, the biggest example of that one would be Area 15, pile

driver.

CHAIRMAN PRESLEY: Right.

MR. SMITH: There was a 1,500-foot vertical shaft drilled down and then it was mined out another 1,200 feet to create rooms for the experimental chambers.

MR. RICH: We had some of both on Alva and an number of other shots, so --

CHAIRMAN PRESLEY: Okay. All right. Path forward: NIOSH is going to go back and look for persons with potential higher doses, flats workers potentially.

MR. ROLFES: Well, I think the bottom line is we're going to pursue additional bioassay data regardless of where the individual worked. There's certainly going to be bioassay data available for flats workers that were participating in drill-backs and working with radiative materials where there was a contamination potential. And I think that's the bottom line.

DR. MAURO: Yes, I like almost a

test -- right now what we're saying is there's two ways to come out of this problem. We could start with describing people, scenarios, events, situations, locations where people who really know the site, like Lynn and many of the folks around here or on the phone, is start to identify people and events tests where you intuitively would say there was a very real potential here. And I'm mainly talking now in the Flats with the bore holes and the shafts where there was very real potential for internal exposure. While that's going on, okay, creating this picture, independent of that you have a crew that's downloading the universal bioassay data that's out there. Okay?

And then you say, okay, let's map one on the other. And we say, holy mackerel, it looks like all of these people that were doing these kinds of things, this test at this time, we don't have bioassay for them. See, I'm looking at it as if I'm an investigator

trying to see where the evidence points me. And of if all of sudden I say, boy, I got a bunch of people here that worked at this facility, at this site, at this time we did this, and I don't have bioassay data for them, at least not back, the next question is, is that okay? And then you go into the records.

Now you start to go vertical and say, okay, maybe there's a good reason why all those people don't have bioassay data. And then we get to the story you told before, there is good reason because they took live samples, they took air samples and at least there was due diligence for making the judgment that that particular person or group of people at that time did not have to have bioassay.

And if that story comes closest in that form, you know, it's very convincing. But if you find yourself in a situation where all of a sudden the people who have identified the scenarios and, you know, say that I've got

all these people and it looks like they should been bioassayed, and then you go and map the bioassay and they're not bioassayed, and there's no good reason why they weren't bioassayed, I think that's a problem. I think that that leaves you open to vulnerability. And here we have groups of people that weren't bioassayed, that we don't have any real justification why they weren't bioassayed. What do you do about that? Because eventually we're going to have to reconstruct their doses and how are we going to do it? And I think that's how the story -- that's how I would package the story.

CHAIRMAN PRESLEY: John, this is Billy. Would you agree that -- well since there are less than one percent of the people ever badged with external dosimeters at NTS that got any external exposures, would you agree that then the potential of people to get internal exposures would be higher than that?

DR. ANSPAUGH: I would say not

always.

MR. MAKHIJANI: There's no basis to establish that. We've been debating the external and internal forever and so far we don't have any evidence to relate to people.

MR. SMITH: Well, you know, the data indicates -- based on the bioassay program that was in operation at NTS indicated that people got very few internal exposures. There were very few positive doses relative to the number of bioassay samples taken. And I'm thinking what Mark is saying is what needs to be laid out on the table is the number of bioassay samples taken of workers, not necessarily by job category, by all of the bioassay samples that were taken. And we can evaluate those to see whether or not there was any real potential for people to get internally exposed.

DR. NETON: I agree. I think we're jumping the gun here a little bit. We need to get a handle on what we have first.

And then if we can get the data, and then we can do this sort of robustness test that John is talking about. I'm a little concerned that the way it sounds to me that these job categories, you know, you could have linemen, electricians, carpenters and you'll have some with bioassay and some without bioassay. And I'm not convinced that we can go in there and definitively determine why some were monitored and some weren't. I mean, we might be able to. We'll have to do some sort of maybe spot sampling, because I just can't imagine going through everybody's record to establish all their work --

DR. MAURO: Yes, of course.

DR. NETON: But on top of that, what happens if for instance we pull these data and all these crafts folks have no detectable bioassay to begin with and we can demonstrate that those were the ones that were targeted as the highest potentially exposed. so what's the reason to believe that this

other population had any exposure? You know, those are the kind of arguments we're going to have to make.

DR. MAURO: All you could do is build a weighted average.

DR. NETON: Exactly. So, I think we're proposing that we're prepared to do that. But let's first go to the data and see what we can pull out. If we can't pull out a lot of data, then we're back at square one and we'll have to rethink what we're doing.

CHAIRMAN PRESLEY: Bob?

MR. MORRIS: Does this suggest that we need a technical call to agree -- that would be off line to agree on these groups that we want to craft?

CHAIRMAN PRESLEY: Yes, I think that what we need to do first is let Jim do what he suggested before we do that and see if we really need to go and pick the groups. Now, the group thing was my idea and it may be down the road it may be good. But let Jim do

his thing, Mark, and then let's go back and see if they think that we need to. At that point then, yes, we can have a discussion between SC&A and CDC to see where we need to go.

MR. MAKHIJANI: I agree with that, too.

CHAIRMAN PRESLEY: And then we can have another Working Group after that. But I don't think we're going to go anywhere now without you all doing your homework on these bioassay data.

MR. MAKHIJANI: I agree with that, too.

CHAIRMAN PRESLEY: Okay. Does the Working Group agree with that, everybody?

MEMBER CLAWSON: Yes.

CHAIRMAN PRESLEY: Okay. That's great. We agree on something.

At this time, John, have we gone through this as far as we can go now until --

DR. MAURO: Yes.

CHAIRMAN PRESLEY: Okay.

MR. KATZ: Just for the record, this was an SC&A --

CHAIRMAN PRESLEY: Right, the coworker model. And, John, we will get you a copy so that you can see this.

John Funk, you there?

MR. FUNK: Yes, sir.

CHAIRMAN PRESLEY: We will get you a copy as soon as this has been cleared. Okay. And we'll send you a copy.

And yes, Arjun?

MR. MAKHIJANI: Could I say something about that, Mr. Presley? Yesterday I got the suggested redactions in the areas where there are Privacy Act issues from Nancy Johnson, who is our point of contact with HHS. And as you know, this report contains a lot of potential Privacy Act data and I have to consult with Nancy and John, and maybe Emily as to what the best way to do it. And maybe that we would only be able to release the

summary or eliminate the tables and the text then might not make sense. It's going to take a few days --

CHAIRMAN PRESLEY: John, you may not get to see everything on this one that we've got on account of the Privacy Act information.

MR. FUNK: I figured that.

CHAIRMAN PRESLEY: Okay. If it's acceptable to everybody, a lot of us have to go home this afternoon. Charles has an early flight. I think John has an early flight. I know I have a long drive. If it's acceptable to everybody not to break for lunch right now and let's hear what John has to say. Unless somebody -- before we break for John, does anybody else have anything that comes in front of the Working Group at this time?

MR. KATZ: I just want to, before John as well, I have this question to you: You have an update scheduled for the board meeting in Amarillo. Does the Working Group

need to discuss the wherewithal of that update in any way?

CHAIRMAN PRESLEY: I was going to do that.

MR. KATZ: Okay. But, I guess I would get that work done before --

CHAIRMAN PRESLEY: Yes.

MR. KATZ: -- opening the floor for John.

CHAIRMAN PRESLEY: I just wanted to make sure that what we -- Gene and I had talked, I haven't talked to Wanda, I haven't talked to Brad or Phil, but you all should have our notes that we had for the -- we were getting ready to give a presentation on March -- wrong one. Back in 2008, we had slides made up to do a presentation -- here it is. Right here. Okay. June 24th, 2008. We sent out a set of slides for a talking presentation, which we did not use.

What Ted has asked is that we go back from day one, give the Board an update on

where we have been and where we think we are going.

I also want Jim to be ready to give a report to the full board on where HHS/CDC stands.

John, I would like for you to do the same thing with SC&A on your work and where we stand.

If anybody has -- what we're going to try to do is get this done in the next week and then get it to the Working Group as a draft. I'll also send Mark a copy, John a copy and Ted a copy. Then everybody can make the comments on that and we will try to have this done for May 1st.

Is that acceptable to everybody?

DR. MAURO: Bob, let me just say there is nothing more than -- as far as I understand it, our work is done until the Board asks us to do something. So we are now sitting and waiting for direction. So the answer to your question is, with that delivery

of that report, there is no more activity on SC&A's part.

CHAIRMAN PRESLEY: At this time?

DR. MAURO: At this time.

CHAIRMAN PRESLEY: At this time. But now, I would like for you to give a report on what you all have worked on, if you don't mind?

DR. MAURO: Oh, summarize that?

CHAIRMAN PRESLEY: Yes, summarize.

DR. MAURO: Yes, absolutely.

CHAIRMAN PRESLEY: That I would do.

MEMBER CLAWSON: So let me get this clear. We're going from a two-day meeting now to a three-day? Or is this an abridged version of where we're at?

CHAIRMAN PRESLEY: We have an hour on the schedule to do an abridged version of where we're at. If questions arise, then, yes, we're going to take a little bit of extra time and answer those questions to the best of

our knowledge. We will have the people at the meeting that can answer those questions. But we do have an hour scheduled with the possibility of an hour-and-an-a-half, as I understand.

MEMBER CLAWSON: And I know that that sounded kind of funny, but going back through my files we have absolutely thousands and thousands of pages.

CHAIRMAN PRESLEY: That's correct. We do. We've got an unreal -- I've got two sticks here full of stuff. One of them is full of John's data that he's got to us.

But that is my path forward as I see it, as the Working Group Chair. If anybody has anything different from that, let me know.

We are trying to end up our work on the site profile. I don't think, I don't know if we'll ever be able to vote on it. I don't know. At some point in time I would like to be able to say, okay, the site profile

stands as it is today, that it is a working document. If somebody brings a change in, then yes, it's going to be changed. If that change is big enough or if it changes enough, then we're going to go back and take another look at dose reconstructions that have been made. But I want us to start working on the SEC after this meeting.

John, where do you all stand there?

DR. MAURO: Well, I have to say that I guess I don't see it the way you described it.

CHAIRMAN PRESLEY: Okay.

DR. MAURO: I mean, the way I see it is that there are a number of very important issues. For example, the new model or the revised model for the -- from dust through suspension. What may emerge related to Table 7-1 and some revised version or whatever occurs from that, to me this is the heart and soul of the site profile. Because

what we're talking about are new strategies, new data, new approaches that in the end are going to result in I believe substantial modifications to the current version of the site profile.

So if you claim or state that the site profiles issues have been resolved, it seems to be misleading because as long as these issues are being worked on, then the site profile needs to be changed, I don't know what that does. And one of the things I'm concerned about is that does this mean that your dose reconstructions for the claimants are on hold until these issues are resolved? Is that one of the things that happens when you're in this mode of dealing with an SEC? There's a lot of work on the dose reconstructions topic.

DR. NETON: The answer is it will --

MR. ROLFES: It depends. I was going to say when we would encounter a claim

that has no bioassay data but has, you know, for example some significant external doses and access logs for example, and statements and interviews in the claim application that say that they participated in, you know, this radiological activity and were exposed to airborne contamination. You know, when we have indicators that show us that this individual clearly had some potential for internal exposure, we would say, hey, this claim -- we need to hold onto it.

DR. MAURO: I understand. So in this call, to the extent you can, it's a judgment call on a case-by-case basis.

MR. ROLFES: Yes, and there are additional methods besides just using bioassay data in order to bound that individual's potential internal dose. And, you know, those methods that we've discussed previously include like OTIB-0018 assigning the maximum permissible concentrations to the individual to bound their potential internal doses. But

there are several methodologies that we could use.

And so to my knowledge, there are no claims right now that I am aware of that we are awaiting a constructed coworker intake model on. So really, we don't have any claims that we are holding onto because we don't have a method to reconstruct their internal exposures.

DR. NETON: Having said that though, this does have a potential to change some of the reconstructed --

CHAIRMAN PRESLEY: Right. Right.

DR. NETON: We have identified classes of workers where we may have used inappropriate -- I'm not saying that we are, but if we come to that conclusion, then we'd have to go back and rework those --

DR. MAURO: The outcome of this process might be --

DR. NETON: But I totally agree with your characterization, John. And it

seems to me that the SEC is the more overarching issue.

DR. MAURO: Right. That's what I'm --

DR. NETON: And the site profile, if you can resolve the SEC issues, you still may have site profile issues remaining. I mean, so it seems to me that until the SEC is put to bed, the site profile can't be closed. And that's just --

CHAIRMAN PRESLEY: That's no problem.

MR. MAKHIJANI: This is an addendum to what Jim just said. I mean, the two reports that were mainly discussed today, the October report and the March report, were really prepared as a comment on the evaluation report for the SEC. They were not prepared, you know, in the site profile discussion.

CHAIRMAN PRESLEY: Right.

MR. MAKHIJANI: And so I completely agree.

CHAIRMAN PRESLEY: And that's something that we discussed in the past.

MR. MAKHIJANI: Right. We have.

CHAIRMAN PRESLEY: That this issue is a site profile issue and --

MR. MAKHIJANI: It could become. I mean, it could -- if it resolves, there will become a site profile issue.

CHAIRMAN PRESLEY: Right.

MR. MAKHIJANI: And if it's not resolved, it will become --

CHAIRMAN PRESLEY: Yes.

DR. NETON: My sense is that if we resolve these SEC issues, the site profile issues are gone and --

MR. MAKHIJANI: Right.

CHAIRMAN PRESLEY: That's exactly right.

DR. NETON: Yes, I think it's all going to come --

DR. MAURO: But, and I said this a while ago, and in my mind as long as there are

SEC issues on the table, that means there are site profile issues on the table.

DR. NETON: Yes, absolutely.

DR. MAURO: They're linked. Now I would say the opposite of that though, you could have a lot of site profile issues and have no SEC issues. But if you have any SEC issues, they by definition --

DR. NETON: There's something wrong with your site profile, yes.

CHAIRMAN PRESLEY: I want the petitioner out there to understand that we are not holding up any petitions by our longevity on this NTS issue.

MR. KATZ: You mean you're not holding up any dose reconstruction?

CHAIRMAN PRESLEY: Right.

MR. KATZ: Yes.

CHAIRMAN PRESLEY: Anybody else have anything else before we let John speak?

DR. NETON: Bob, just a point of clarification. The NIOSH presentation you'd

like at the Advisory Board meeting, I assume that that's just a verbal note. I don't need a slide presentation or anything?

CHAIRMAN PRESLEY: If you want to have slides, I think that would be nice. We're going to have our slides and I'm going to talk to you, you know, asking you to --

DR. NETON: Okay. Well, we could do that.

CHAIRMAN PRESLEY: You know, and I'm not talking about 30 or 40 slides. I'm talking about maybe a one or two where you all stand.

DR. NETON: Yes, our current status?

CHAIRMAN PRESLEY: Right.

DR. NETON: So I think John can summarize --

DR. MAURO: I wrote down that I will write some brief report that gives our perspective on what we did.

CHAIRMAN PRESLEY: Right.

DR. NETON: How we got here.

DR. MAURO: If you want, I can -- where we are. I'll send that in. Do you want me to also to be prepared to get in front of the microphone and tell the story?

CHAIRMAN PRESLEY: Yes. Yes, sir.

DR. MAURO: Okay.

DR. NETON: My view is that you would present how we got to where we are versus even now, then I would present how we're dealing with it right now, the current status.

CHAIRMAN PRESLEY: Are we in agreement?

MEMBER MUNN: I'm fine with the current plan.

CHAIRMAN PRESLEY: Gen? Phil?

MEMBER ROESSLER: Fine.

MEMBER SCHOFIELD: Fine.

CHAIRMAN PRESLEY: Everybody all right? Arjun?

MR. MAKHIJANI: Yes.

MR. KATZ: So, John?

MR. FUNK: Yes?

MR. KATZ: Are you with us? Let me just, as a preface before sort of raising your questions and issues, just, please -- well keep to the issues of the SEC matters, site profile matters. I know you have issues, you may have issues with your own particular claim, but please, please avoid those matters for this question and answer session. Thanks.

It's all yours, John.

MR. FUNK: Okay. Thank you, ladies and gentlemen of the Board. I'll dispense with the formality of recognizing you all. Right at the minute, I don't have your list of names in front of me.

I'd like to bring up -- there's been some discussion as to the amount of radsafe personnel who were on the site. I worked out there from 1976 until 1994. If such a contingent of radsafe monitors were on the test site, I can sure tell you I never

seen any of them. I seen a few of them around occasionally, but not to the degree what you're trying to portray that they were out there.

There is a potential for more exposure in the Flats, but you have to look at the right people. And I'll make a suggestion as to that. One of the personnel who could have suffered more exposure than anybody else would have been the superintendents for RICO, especially -- I'll give you some names. [Identifying Information Redacted].

MR. KATZ: Wait, wait. John, please don't give us actual names. I would welcome you submitting those names to OCAS, for example, but this is privacy information. It would be better if you didn't say the specific names on the phone.

MR. FUNK: All right. I'll --

MR. KATZ: Thanks.

MR. FUNK: But I would say the RICO superintendent, because they always --

they were involved in all the site assessments, reentry. They were involved in all the additional reentries. There has been some discussion as to where incidents happened that bioassays would have been demanded. I can truthfully tell you that there was incidents that happened out there that nobody turned in that never became an incident. They simply just let it slip to the side and let it go. I won't get into that, because one case involved my case personally, so I won't discuss that one.

There's also a lot of misinformation here about potential for exposure comparing tunnel workers to flat workers. I would hope that that would be looked into further. I've talked to John Mauro and Dr. Anspaugh on this. They are well aware of my concerns.

I had a formal presentation put together here, but it kind of went south because it seems like a lot of the issues I

had had, had seemed to be already resolved before I even got opened into it. I noticed some of the Board Members asking certain questions that led me to believe that they've already become aware of some of my concerns.

And I would like for this -- before we make any decision as to the occupational internal/external environment exposures, that they get some of their site profile supporting documents squared away and identify the different shots or the different types of shots they were before they can proceed on that.

And other than that, it seems like everything seems to be going okay. So I'll go ahead and let you guys get home.

CHAIRMAN PRESLEY: Okay. John, thank you very much. We appreciate your comments. Are you feeling better?

MR. FUNK: Oh, yes. Yes, I'm back a little bit better.

CHAIRMAN PRESLEY: Thank you very

much for your comments. We appreciate it.

One of the things that Brad has brought up is Area 51. Where we stand with Area 51?

MEMBER CLAWSON: Especially the earlier years. I know that we finally acknowledged it, but I haven't heard anything since.

MR. ROLFES: Area 51 is considered --

(Whereupon, the proceedings went off the record at 12:32 p.m. and resumed at 12:32 p.m.)

MR. KATZ: Okay. Folks on the phone, we lost power for a moment, but we stopped conversation at the same time. So I don't think you've missed anything.

MR. RICH: Okay. We're back.

CHAIRMAN PRESLEY: Now, we're talking about Area 51. Okay? What we discussed in quite a few of the early meetings was that Area 51 is part of the test site.

And the people that were into the nuclear-type work were still -- they fall under the NTS umbrella. Is that correct, Mark?

MR. ROLFES: That's correct. And for example, for the DOE personnel that entered Area 51, they were subjected to the exact same monitoring requirements as the rest of the Nevada Test Site. And I think that's really the bottom line. It has been added as part of the Nevada Test Site and it is believed to be within the confines or within the border of the Nevada Test Site as indicated by a memorandum from DOE to DOL.

CHAIRMAN PRESLEY: Yes, I remember when that letter went out.

Arjun?

MR. MAKHIJANI: Do we have any indication about the exposure potential? You know, we were talking about categories of workers and how you're going to find the people with the high exposure potential. Do we have any way of comparing the exposure

potential of the people who went in and whether they were monitored, because --

MR. ROLFES: Yes, they were. They were monitored.

MR. MAKHIJANI: Will be able to establish that?

MR. ROLFES: Yes, if you look at the NOCTS records, the data that we've been receiving from DOE has actually included any exposures received in Area 51.

MR. MAKHIJANI: Okay.

MR. ROLFES: That has been routinely provided to us historically.

MR. MAKHIJANI: Bob Barton, are you there?

MR. BARTON: Yes, I'm here, Arjun.

MR. MAKHIJANI: Did we find any of that in our 220-worker examination?

MR. BARTON: Specific to Area 51, I can't say offhand. I know we found some film badge records that indicated Working Area 52, which I believe was the Tonopah Test

Range.

MR. MAKHIJANI: Right.

MR. BARTON: But as for exposure in Area 51, I can't say offhand.

MR. MAKHIJANI: Okay. Because I don't recall it.

MR. ROLFES: Okay. If you take in the NOCTS records that we do have from DOE, there are in fact Area 51 exposure records.

MR. FUNK: I'll make a correction to that. This only covers Department of Energy workers. The aerospace workers are not covered under this site profile recognition.

MR. ROLFES: We are only reconstructing Department of Energy or Department of Energy contractor exposures that were incurred.

CHAIRMAN PRESLEY: That's correct. Yes. No, Air Force, no aerospace workers. Yes, John. Is that all right, John?

MR. FUNK: Yes, sir. Yes, sir.

CHAIRMAN PRESLEY: Brad, did that

answer your question?

MEMBER CLAWSON: Yes, I just wanted to make sure because this has been an issue that had been brought up earlier. I know they recognized it finally and I just didn't know where we was at, if we had looked at this. Because one of the issues were people working up there during the open air shots and so forth.

One other question, though. Tonopah was put under something else, wasn't it?

MR. ROLFES: It was part of the Sandia Test --

MEMBER CLAWSON: Sandia? Okay.

MR. ROLFES: -- Sandia's site profile.

MEMBER CLAWSON: That's what I wanted to make sure, because originally this came up as Tonopah and 51. I know that there was a break there and I just wanted --

MR. ROLFES: There's quite a bit

of distance between the two sites, so --

MEMBER CLAWSON: Right. And I just wanted to make sure how we were handling it.

CHAIRMAN PRESLEY: John, are you happy with that?

DR. MAURO: Regarding Area 51?

CHAIRMAN PRESLEY: Yes.

DR. MAURO: Yes, my understanding of its relevance here is that that's -- is anything about the exposures that may have occurred to covered workers in Area 51, it has to be captured by whatever methods are used. Whether it's the re-suspension model that we're talking about and whether it is the bioassay data. So if there's any reason to believe that there were work activities that took place in Area 51, there's a potential for elevated internal exposures. So it's really no different than anything else. So we just have to make sure that we -- you know, and if the data are there, they're there.

MR. FUNK: John, there was quite a bit of clean up in one area where they excavated three foot of soil from a huge area. I think it was two square miles.

DR. MAURO: Well, I mean, there's reason to believe that type of activity, just like some of the events we talked about, or anything else, it's something that where workers intuitively would say there's a potential there for substantial internal exposure, then they'd fall into that group of workers and we'd map that if we have bioassay data. And if we do, we do. If we don't, why not? So I guess there's nothing about that that separates it.

CHAIRMAN PRESLEY: Not as far as I'm concerned.

MR. FUNK: Area 51 has been overlooked on Baneberry. They talk about everything, the whole site with the exception of Baneberry. And Area 51 should be included in the Baneberry report.

CHAIRMAN PRESLEY: All right. Thank you, John.

Ted?

MR. KATZ: No.

CHAIRMAN PRESLEY: Does anybody else have anything else? Any of the Working Group have anything for the betterment of the group?

MEMBER MUNN: No.

CHAIRMAN PRESLEY: Gen and I will work on this. If you have anything that you all think needs to be put in this report to the Board, please send it to me or Gen and we will take what notes that I gave to Gen from your past meetings and get it in there. And then we'll get a working draft out to everybody to look at. Because I sent Gen about 10 or 15 pages of stuff from the past that we had on our previous reports to the Board.

MEMBER CLAWSON: I'd like just like a -- I'll probably delete it because we

didn't use them. Yes, sorry.

MEMBER ROESSLER: I can give you a copy right now of that.

MEMBER CLAWSON: You can forward it to me.

CHAIRMAN PRESLEY: She's got everything on one --

MEMBER ROESSLER: I've got it right here. We can just plug it in and --

CHAIRMAN PRESLEY: Yes, that would be the easiest thing to do. Because I'm going to back and --

MEMBER ROESSLER: And if you would take a look at it and mark it up and update it, that'll help us.

MEMBER CLAWSON: Okay.

CHAIRMAN PRESLEY: Anybody have anything else? Thank you all for your participation. This has been a good group.

MR. KATZ: Okay. We're adjourned.

(Whereupon, the meeting was adjourned at 12:39 p.m.)