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

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON

RADIATION AND WORKER HEALTH

NEVADA TEST SITE

The verbatim transcript of the Working Group Meeting of the Advisory Board on Radiation and Worker Health held in Erlanger, Kentucky on November 15, 2006.

C O N T E N T S

November 15, 2006

TRANSCRIPT LEGEND

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-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

P A R T I C I P A N T S

(By Group, in Alphabetical Order)

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HOMOKI-TITUS, LIZ, HHS
HOWELL, EMILY, HHS
KOTSCH, JEFF, DOL
KUBIAK, MIKE, ORAU
MAKHIJANI, ARJUN, SC&A
MCDONOUGH, ALEX, SEN. REID
NETON, JIM, NIOSH
ROLFES, MARK, NIOSH
ROLLINS, GENE, ORAU
SHIELDS, LASHAWN, NIOSH
SMITH, BILLY, CHEW AND ASSCS.
SMITH, CHERYL, DADE MOELLER AND ASSCS.
STAUDT, DAVID, CDC
SUNDIN, DAVE, NIOSH

P R O C E E D I N G S

(9:00 a.m.)

WELCOME AND OPENING COMMENTS

DR. LEWIS WADE, DFO

MR. PRESLEY: Lew, you want to call us to order and...

DR. WADE: Okay, sure. This is Lew Wade and I have the pleasure of serving as the Designated Federal Official for the Advisory Board, and I'd like to call to order this meeting of the -- the working group of the Board. This working group is focused on issues related to the Nevada Test Site site profile, and it's chaired by Robert Presley, with Brad Clawson, Wanda Munn and Gen Roessler as members. And all of those individuals are here at the table.

By way of background, there was some discussion earlier in the week as to whether we should hold this meeting or not, and in my role I suggested that we -- we go forward with the meeting. I don't know that we have a full day; I don't know that we don't, but I think that this is a very important process to keep going. One of the things that sort of caused me to

think that having the meeting was in order is that out of this Nevada Test Site workgroup there have come some very important issues that have been sort of designated as more generic issues above the test site itself, and I think we need to keep those issues focused, and I think Jim Neton is here to talk to us today about some of those generic issues. And while it might not be the responsibility only of this workgroup, I do think that this workgroup is where those ideas started to come forward. And I think we need to talk about them here and then I think the Board needs to decide possibly who would have the responsibility of tracking them, but I think it is a terribly important issue.

So again, I thank all of you who have made the trip. I know it's difficult and arduous, and this has been a difficult two weeks with Board meetings and there's a subcommittee meeting tomorrow, and another working group meeting on Friday. So I appreciate all of your efforts and your willingness to serve, and I particularly thank Robert for being here and leading us. So Robert, it's all yours.

MR. PRESLEY: Okay. Do you want to go through and say who's here?

DR. WADE: Yeah, I'm sorry, we should do that. Let's go around the table and say who's here, and then we'll do the phone line. This is Lew Wade and I work for NIOSH.

MR. CLAWSON: I'm Brad Clawson. I'm on the Advisory Board.

MS. HOWELL: This is Emily Howell. I work for HHS.

DR. BEHLING: Hans Behling, SC&A.

DR. NETON: Jim Neton, NIOSH.

MR. ROLFES: Mark Rolfes, NIOSH.

MR. PRESLEY: Robert Presley, Board member.

DR. ROESSLER: Gen Roessler, Board member.

MS. MUNN: Wanda Munn, Board.

DR. WADE: Now let's have those on the phone identify themselves. We'll start with members of the NIOSH or ORAU team. Anyone else out there?

MR. ROLLINS: This is Gene Rollins. I'm with the ORAU team, DMA, subcontractor.

DR. WADE: We appreciate your being here, Gene. I know this is a busy day in your life, I think, and we appreciate your being here.

MR. SMITH: My name is Billy Smith. I'm with Chew and Associates.

DR. WADE: Okay. Other members --

MS. SMITH: My name is Cheryl Smith, Dade Moeller and Associates.

MR. KUBIAK: My name is Mike Kubiak. I'm with the SEC group on the ORAU team. I'm conflicted with NTS due to my MGW for our corporate.

DR. WADE: Thank you. Other members of the NIOSH/ORAU extended family?

(No responses)

SC&A team?

DR. MAKHIJANI: This is Arjun Makhijani.

DR. WADE: Thank you for joining us, Arjun. We're better when you're with us.

DR. MAKHIJANI: Yeah, sorry I couldn't be there.

DR. WADE: I understand. Other SC&A members?

(No responses)

Other federal employees who are on this call as part of their employment?

MR. STAUDT: This is David Staudt with the CDC.

DR. WADE: Welcome, David.

MR. KOTSCH: Jeff Kotsch with the Department of Labor.

DR. WADE: Welcome, Jeff.

MS. SHIELDS: LaShawn Shields, NIOSH.

DR. WADE: Good morning, LaShawn. Other federal employees who are here by virtue of their employment?

(No responses)

Any members of Congress, representatives of those members or representatives of claimants or petitioners who would like to identify themselves?

(No responses)

Are there other Board members on the call, other than the four that are with us here in the room?

(No responses)

Good, we don't have a quorum. I guess I would like to go back and have members of the -- the NIOSH/ORAU extended team and then the SC&A team identify any conflicts that they might have, so let's start with the folks here. Jim?

DR. NETON: Jim Neton, and I don't believe I have any conflicts at NTS.

MR. ROLFES: Mark Rolfes, I have no conflicts.

MR. PRESLEY: Robert Presley, I have no conflicts.

DR. ROESSLER: Gen Roessler, no conflicts.
MS. MUNN: Wanda Munn, no conflicts.
DR. WADE: Lew Wade, no knowledge, therefore no conflicts.
(UNINTELLIGIBLE): (Unintelligible), no conflicts.
MR. SMITH: Billy Smith, I have a conflict.
DR. BEHLING: Hans Behling, no conflicts.
MS. SMITH: Cheryl Smith, no conflicts.
MR. ROLLINS: Gene Rollins, no conflicts.
DR. MAKHIJANI: Arjun Makhijani, no conflicts.
DR. WADE: Anyone else who needs to make that confession of the soul?
MR. KUBIAK: No -- well, Michael Kubiak again. I have a conflict through (unintelligible) MGW Corporation.
DR. WADE: Would you say that again, please?
MR. KUBIAK: Michael Kubiak. I have a corporate conflict due to employment with MGW Corporation.
DR. WADE: Thank you. Anyone else?
(No responses)
Again, I would ask all of you on the phone to practice good phone etiquette and mute if you're not speaking. And Robert, I think now

I've done my job.

MR. PRESLEY: All right. What I thought we would do today is start through the comments, and I'm going to read them off and if anybody's got any responses, we're going to stop at the (unintelligible).

Is that all right? If we have actions or if the response has changed or if Mark has something -- I want to thank you for this update spreadsheet very much.

MR. ROLFES: Thank you, Bob.

MR. PRESLEY: Very, very much. Has anybody got a problem with that? We'll go right through these things and try to --

MS. MUNN: No.

MR. PRESLEY: And then once we get through them, Jim, do you want to talk about the overriding issues all at once or do you want to --

DR. NETON: No, I think they sort of (unintelligible) --

MR. PRESLEY: -- as we go through -- do them one at a time as we go through?

MS. MUNN: Yeah.

DR. NETON: They'll self-identify themselves in

the comments and, where necessary, I can speak.
MR. ROLFES: Bob, before we begin, could I check with Gene Rollins on the phone to see -- on his availability? Gene?
MR. ROLLINS: Yes, I'm going to have to leave you about ten minutes before 10:00, and -- but I should be back on the phone call within 45 minutes to an hour.
MR. ROLFES: Okay. If it's all right with the Board, I wondered if we could discuss some of the issues that we have Gene Rollins down for the assignment.
MR. PRESLEY: I think that --
MR. ROLFES: Okay.
MR. PRESLEY: -- that'd be great. That'll be good.
MS. MUNN: Gene, is that ten till your 10:00 or ten till our 10:00, or is it all the same 10:00?
MR. ROLLINS: Oh, I think we're all on Eastern Time, I believe.
MS. MUNN: Okay.
MR. PRESLEY: He's on Eastern Time.
MR. ROLFES: Okay. Well --
MR. PRESLEY: I'm going to let you -- since you

know which ones that he's been working on, I'll let you start it.

MR. ROLFES: I think -- okay, Gene, I don't know if you want to go ahead and take the first item that -- are still working on. I know we discussed the resuspension issue as one of the major issues.

MR. ROLLINS: As I -- as I mentioned to you days ago, I think that issue is going to require a good bit of discussion. Hopefully we can -- we can get some input from -- from everyone on -- on that subject, and it might take longer than 45 minutes to do that, so I would -- I would recommend maybe that we put that off until later so we can give it the full discussion that it needs.

MR. ROLFES: Okay.

MR. ROLLINS: Now Mark, I -- I presume that everybody has this matrix that was provided to us on Friday, this updated matrix. Is that what we're working from?

MR. ROLFES: Yes, I believe so.

UNIDENTIFIED: Do you have an extra copy?

MR. ROLFES: I do not have an extra copy.

DR. ROESSLER: You know what, I think -- let me

just make sure, I think I have it on my computer and then you can have my --

MR. PRESLEY: Can you -- can you download it off my stick?

UNIDENTIFIED: Yes.

DR. NETON: Should be able to.

MR. PRESLEY: Can you get a copy off my stick?

MR. CLAWSON: Yeah -- well, I'll borrow hers. Let's go ahead and go (unintelligible) --

DR. WADE: Does anyone else need a hard --

DR. BEHLING: Yeah, I would --

DR. WADE: Okay, I will -- here, you take --

MR. ROLLINS: What we have tried to do with this matrix is to -- is to shade the items that we feel like we have resolution on. And the items that are not shaded are the ones that we need to discuss in a little more detail.

RADIONUCLIDES

And so starting with comment one on page 1 of 26, that had to do with some tables of radionuclides that were deemed as not being complete, and we agreed and said that we would add those radionuclides.

And frankly, I don't know why that particular item is not shaded, but I don't think we need

any further action on that. Does -- do we have general agreement on that one?

MS. MUNN: It's my understanding at our last meeting that we did. My -- my only question was where are we with the Chapter 5 revision. Are we actually there, or is that still in process?

MR. ROLFES: That's still in process. The -- I believe ORAU has been working on it. I do not believe we've received an official copy of the revision yet for review. Is that correct, Gene?

MR. ROLLINS: Right. They -- they -- they're all coming up for two-year review and decided to put that review off a little bit until we could get some resolution from this working group as to what changes needed to be made so we wouldn't have to go back and revise again. But that -- that revision is imminent.

MS. MUNN: So my -- my understanding is correct, we did come to a reasonable consensus at our last meeting. Right? So you --

MR. ROLLINS: Correct.

MS. MUNN: So it's just a question of process here, not a question of issue.

MR. ROLLINS: Correct.

MS. MUNN: Thank you.

DR. MAKHIJANI: This is Arjun. Ms. Munn, that's quite right.

MS. MUNN: Thank you, Arjun. Arjun, as long as you're on the phone, are you going to be at the hearing today?

DR. MAKHIJANI: Yes, I intend to be.

MS. MUNN: Oh, good. I'd be interested in your -- in your feedback after that's over.

DR. MAKHIJANI: I'd be happy to give it to you.

MS. MUNN: Thank you.

MR. ROLLINS: Moving on, response -- responses 1(b), 1(c) and 1(d), which -- 1 delta -- I show them as all being resolved. You might want to just look over those for a minute and -- to make sure that we're on the same page there.

MR. PRESLEY: That's what I show, Gene. This is Bob Presley.

MR. ROLLINS: Okay. Thank you, Bob.

DR. MAKHIJANI: Right, I agree also.

REACTOR TEST RE-ENTRY

MR. ROLLINS: And then comment two had to do with providing guidance for dose estimation for gonad, skin and GI tract for reactor test re-

entry, including considerations for large hot particle doses to the skin and the GI tract, and to take into consideration the methodology outlined in the NRDL document. We agreed that that would be appropriate, and after we have a chance to look through that, and I think that's -- we recently brought on Billy Smith to help us with that -- with that consideration. I don't think he's had -- I'm -- I'm not going to put him on the spot because he hasn't been looking at it for very long, but we will take those methods into consideration and, as appropriate, we will revise the TBD to provide the guidance to incorporate those methods.

DR. NETON: Right. This is Jim Neton. I've gotten into this as of -- as of the last couple days, and I've taken a look at the NRDL document and I think we need to be careful -- and it's alluded to later on in one of the responses -- about wholesale adaptation of the values that are in there, principally because that document was written in 1968 and it was their early attempt at trying to do some dosimetry for these large hot particles; that those methods have been largely superseded by

some of the new ICRP models -- the ICRP-66-1 model and GI tract model -- which I believe was around in that time period, but how it's applied and linked to this -- linked to the respiratory model is -- is unique now. So I -- I don't know that, outside of the source term evaluation that's in this document, there's going to be a whole lot of extra usefulness as far as guidance on how to actually calculate the dose from these hot particles. I just --

MR. ROLLINS: Jim, this is Gene Rollins. You're -- you're exactly right, and that's why I -- I put the qualifier in, as appropriate. But there are -- there are some things in there I believe that could be of value, as you said, such as the source term estimations.

DR. NETON: Well, there -- there appear to be some -- some pretty decent particle size distribution measurements and -- where they show that there's some fairly large particles. You know, as far as ingestion doses from hot particles, that gets into an area where we may have some complex-wide overarching issues. It appeared to me in a quick look at this document that what they were really trying to do was to

calculate the GI tract dose from the inhaled and subsequently swallowed particles. I don't -- I don't think this is a de novo look at just ingestion of the particles, you know, off of the ground or anything. And in that case, I think the ICRP-66-1 model somewhat supersedes that -- that calculation and in fact that the doses would primarily be more relevant to the nasal/pharynx region, what's called the ET-1 and ET-2 region of the -- of the GI -- of the respiratory tract. And I don't think that would be a change in -- a paradigm change in our way of doing business. We would just buy the ICRP models and use the appropriate particle size distribution that we could glean from this document. So I think that's fairly straightforward and I think it's indicated here we're committed to doing that, but I just wanted to sort of let people know that by and large the dosimetry done in here would not necessarily be relevant to our dose reconstructions.

DR. MAKHIJANI: This is Arjun. We raised the issue, not -- you know, not in the idea that NIOSH would be adopting the dose numbers, but

as -- as an issue where hot particles appear to be important. There were measurements of these particles and there was a source term that was not covered in the site profile, and so the issue in our review was raised for NIOSH to evaluate it, and I don't believe we've made the suggestion that NIOSH should adopt the -- adopt the dose numbers, so -- so I support what -- what you just said, Jim --

DR. NETON: Exactly, I --

DR. MAKHIJANI: -- that obviously we're committed and you're committed by the regulation to using the most recent model, so the -- and I do agree also that the source term as well as the particle size measurements are probably the most useful part.

I have a question about your statement that it is basically via -- ingestion via inhalation. I think the kinds of particle sizes that were talked about in -- in the Naval Radiological Defense Lab document are non-respirable particle sizes, and a lot of the discussion in there -- if I remember it correctly, I haven't looked at it in a while -- is about non-respirable particles, so I don't -- I don't

think that it would be covered by resp-- respirable particles alone.

DR. NETON: Well, I think it would, Arjun. I did a quick look at this and I could be off base, but my -- my quick read of this was that they're really looking at particles that -- that lodged in the upper airways. And those are, by definition, non-respirable. They all get stuck in the -- in the head, you know, the upper airway region, and then would be swallowed. By non-respirable, they're not deposited in the deep lung. So I didn't see any indication in here of just sort of a source term where they calculated ingestion of material from the surface itself due to the picking up of the material on your hands or -- or from your face. It could be in there, maybe I missed it. But --

DR. MAKHIJANI: No, no, I agree with that. No, I don't -- I don't think it's in there, although mine is from longer ago than yours.

DR. NETON: No, I think -- I think this does raise some complex-wide issues. I noted in the matrix that there were -- was some disagreement whether this was complex-wide or not. I think

-- I think the general issue of hot particles certainly is a complex-wide issue where it -- where it might exist. In fact, we don't -- we have not really done much in the area of hot particles because many of our facilities we didn't feel was -- was necessary to account for that. But in the area of skin contamination -- and this document, by the way, predated Varskin, too -- we don't see any real change necessary. If we -- you know, we would use Varskin for skin contamination dosimetry, and I think the smallest area of skin as documented by most bodies -- including the NCRP, NRC, DOE -- would be one square centimeter of skin to calculate the dose averaged over. And in doing so, our models easily account for that. It's just a matter of identifying the existence of a hot particle on that particular portion of skin.

It brings up an interesting issue, though, and this sort of falls into the real overarching area, is even if you are capable of calculating a dose to one square centimeter of skin from a hot particle -- say for a beta emitter -- how relevant is the risk model that we use to -- to

that dose value, because you know the risk models were based on essentially parallel beam whole body exposures, to a large extent, and there's been a lot of experiments that tend to indicate both directions, either the risk is higher or lower, by irradiating a small area. Many areas of research have indicated that the actual do-- the risk is lower if you concentrate the area into one small particle, very analogous to an alpha irradiation where there is a smaller number of cells affected and that many of the cells will be killed through this process, so with no killing, then the risk of cancer will bound because dead cells can't be cancer cells. So there's some investigation we need to do in that area to see the applicability of the risk models to the hot particle dosimetry, but the physical calculation itself we believe we have covered using the Varskin calculation limiting the area to one square centimeter, where necessary. Of course the trick is to identify those situations. In this NDRL -- NRDL document there are some good indications of how prevalent these hot particles may be and what -

- what -- what we might be able to use to calculate the dose.

DR. ROESSLER: So to update this -- this is Gen -- table then where we have two conflicting things, one is that it is a complex-wide issue and one column says -- and it's probably Gene Rollins -- that it's not. I think you're saying that it is.

DR. NETON: Well, I think hot particles in general are complex-wide issues and we need to -- I don't say that we're mishandling them, but I think we -- we need to develop some -- some direct guidance on -- on handling them. I think that would be useful.

DR. MAKHIJANI: Could -- could I ask a question about what is happening in regard to the dose reconstructions that are being done like for tunnel re-entry and other -- I mean have you found this relevant for other than reactor workers. And if so, what -- what is happening with the dose reconstructions on this?

DR. NETON: I can't answer that question, Arjun. I don't know if Mark can --

MR. ROLFES: Gene, have we seen any cases where we've noted that a person was contaminated with

a hot particle?

MR. ROLLINS: Cheryl, I hate to put you -- I personally have not -- I'm going to let Cheryl speak in just a minute, but from my -- my own experience in doing a limited number of NTS dose reconstructions, typically hot particles would not be associated with cancers except those that are affected by non-penetrating radiation, such as skin and breast. And typically what we have done and what I -- what I typically have done at Hanford doing dose reconstructions there is that we go through the records to see if there's any evidence that an individual was contaminated, and then we look at the areas in which the contamination was identified and we compare that to the particular cancer of interest to see if there's -- if there's a link-up. And if there is, what we have done in the past is employ the Varskin code to calculate what the potential dose to that -- to that can-- cancer location might have been.

Now I'm going to let Cheryl speak to her experience 'cause she's probably done a few more of these at NTS than I have.

MS. SMITH: For the most part it hasn't -- has not been an issue because we're provided those records that indicate the other monitoring. If we have them -- okay? -- you can -- you can figure out where they made their entry. Quite frankly, contamination incidents -- you know, people will talk about them in their CATI, but we don't have enough specifics, we don't have -- I know I've seen at Rocky Flats some reports saying well, a person has been -- and -- and I think Hanford has these reports where, you know, they'll indicate where the person was contaminated, and there'll be a report included in the DOE files. But we've never seen anything like that. Now whether they actually did that -- and maybe Billy would be better able to speak to that -- kept files like that in individuals' case folders, I don't know. We have not seen it at this point in any of the cases that I've worked.

MS. MUNN: Arjun, this is Wanda. If I understood your question correctly, my memory from other working groups is that you personally have brought this issue up on other occasions, have you not? On other sites?

DR. MAKHIJANI: The dose reconstruction issue? No, Ms. --

MS. MUNN: No, the hot particle theory, have you not --

DR. MAKHIJANI: Yes, it's in our review.

MS. MUNN: Yes, but -- but I -- I guess I was misunderstanding your question. I -- I thought we were questioning whether this was an NTS issue or whether this was a more generic issue. I thought that was the topic of discussion. Was I -- am I off base? Isn't that where we started?

DR. NETON: Well, I mean I would agree that we need to have more specific guidance to our dose reconstructors on how to deal with hot particles.

MS. MUNN: Yeah, and -- and that's what -- and -- and I -- I guess I misunderstood what Arjun's question was then.

DR. MAKHIJANI: Yeah, yeah, because, you know, just -- I was just taking off from what Jim just said, Ms. Munn, that if there is specific guidance that -- that's lacking, what happens right now if this problem occurs in a dose reconstruction.

MS. SMITH: Yes, I guess --
DR. MAKHIJANI: How do they do it now?
MS. SMITH: -- we can say that -- we've been pretty careful about -- because it's still kind of up in the air how to handle all of the skin cancer issues -- the beta/gamma ratios, you know, how we're going to apply those -- we've tried to keep those -- keep those cases -- not work those cases until we are -- do have a clear path forward.
DR. MAKHIJANI: Now, okay.
DR. NETON: But this gets into the area, though, where, you know, you -- you're not likely to have hot particle dosimetry -- or measurements on many of these people, particularly in the early days, so then what -- what do you do? Is it -- since you can't prove a negative, do you default and everybody has hot particles or do you go with the weight of the evidence that it's not likely, and there's some good -- good analyses in this NRDL document I think that can be applied just to sort of get a handle around the frequency of these hot particle events in a specific situation. I mean it's just got to be -- it's

case-specific, you know, the existence of these hot particles. But how you deal with that when they are there, I think we need to have a little better -- better guidance.

MR. CLAWSON: Well, Jim, this is Brad. Where would -- where would you say these hot particles are more prevalent or -- or are they a complex-wide issue or just NTS?

DR. NETON: No, not just -- they're -- they're around. I mean it -- you've got to have -- for hot particles to be -- you've got to have some kind of -- more likely a reactor or something of that nature where you -- you've had a particulate, you know, fission products (unintelligible) activation products (unintelligible) --

MR. PRESLEY: Or a -- or an accident.

DR. BEHLING: Were there any kind -- detonations that turned out to be a dud? I know that, for instance, in the Marshall Islands there were several detonations where the primary explosion took place but the fission product never did, and there were large amounts of plutonium fragments scattered all over the test site which are then potentially

hot particles. Were there any such incidents at NTS where you had a test that didn't -- it turned out to be a dud but the material exploded from -- from the primary charge and it scattered hot particles? One particular case that I'm very familiar with in Marshall Islands was (unintelligible) plutonium device was -- was detonated and scattered a large amount of large particles, plutonium particles, throughout the area. Was there a potential to that at NTS?

MR. ROLFES: Gene or Billy, could you comment on that? I know that there were some plutonium dispersion tests at Nevada Test Site. I wondered if we could elaborate on that. I believe I spoke with Martha DeMarre about one of those instances where they did achieve criticality during one of those tests. Do we have any indication of a person being exposed to large particles of plutonium that could have contained fission and activation products?

MR. ROLLINS: This is Gene Rollins. They did a series of safety tests where they were trying to determine whether or not the -- with the safety zone whether or not a device would go

critical, it would -- just on the high -- high explosives, but I'm going to let Billy speak to that because he has far more experience in that area than I do.

MR. SMITH: This is Billy. My experience is that there were some safety tests conducted at NTS, but I don't know of any incident where there were people exposed to hot particles as a result of those safety tests. Most of the safety tests that I'm aware of -- and my experience goes back to 1966 -- were conducted underground, and you know, safety tests were generally low -- very low yield tests. Most of them did not go nuclear anyway. And this was, as Gene has just indicated, a test to see whether or not you could make the thing go nuclear with the HE that was wrapped around the pit.

Before I comment further I'd like to make a comment about the NRDL report. This -- this report I think tends to try and -- and -- well, the comments that are in the matrix tend to indicate that the model may fit the NTS environment, and it seems to me that, given how the NERVA project worked over at Area 400 where

they tested the nuclear rocket engines, hence passing hydrogen gas through the hot cores to accelerate it out through the nozzles, the hot particles that came out as a result of that would have been suspended up into the atmosphere and the distribution and isotope types that were created during that process were significantly different from the fission products that are created during a nuclear test. And from nuclear tests -- that were underground, anyway -- where some activity may have been released to the environment would have been scrubbed by the overfill that was above the detonation zone that a lot of these particles would not have gotten out into the environment, particularly the heavier particles, the transuranic particles. You would get the volatiles coming out of the hole, and they would be carried to the wind and the daughter products would be distributed along the downwind patterns. But in terms of the re-entries, the tunnel re-entries or the vertical shot hole re-entries, these people were not necessarily exposed to any hot particles that -- that would have been created by any means.

Does the silence mean I was cut off?

MS. MUNN: No, no, it doesn't. It means we're lost in thought here.

MR. SMITH: Oh, okay.

MS. MUNN: So to recap, if I understand correctly, I'm led to believe that Jim's earlier statement was quite accurate. These types of cases will have to be reviewed on a case-by-case basis rather than on a wholesale approach, based on the type of incident that was involved and based on the -- the location of the individual, and will have to do what I think we're probably charged with doing, which is depend upon the weight of the data to define the approach. Is that a reasonable summation?

MR. SMITH: Yes. I -- now Ms. Munn, I think -- I think the hot particle issue is a complex-wide issue.

MS. MUNN: Yes, we understand that.

MR. SMITH: The -- the -- and I think in terms of the NTS exposures, it's -- it's -- it's probably lower down the priority chain than other sites where hot particles may be more prevalent. We -- we did not experience hot particle exposures at NTS to any significant

degree at all. As a matter of fact, I don't know of any dose reconstructions that -- that -- that have been looked at so far that have involved concerns with hot particle exposures.

MS. MUNN: Yeah, and this will be true of a number of other sites, as well. Yeah. Thank you.

DR. BEHLING: I do have a question. I mean that hot particles existed is probably something that doesn't require much of a debate, but the question of how do you apply any kind of dose model, especially when you talk about a -- a hot particle that, as Jim Neton had talked about, is a non-respirable particle that starts out somewhere in the upper respiratory tract, gets passed from there into your GI tract and therefore exposes everything from the head back to -- to -- to the point of the colon and rectum. How do you -- how do you anticipate modeling such a -- an exposure?

DR. NETON: Well, I think the 66-1 model can handle particles that are deposited in the nasal/pharynx region. It handles larger particles. And I think we would use standard -- standard dosimetry for that. I -- I've

looked at NCRP Report 130 that was written in 1999 that -- that dealt with this exact issue on ingestion of hot particles, skin contamination -- the whole hot particle issue. And their basic recommendation was unless you can show that there is some (unintelligible) transit time of the hot particle through the GI tract, to treat it just as a insoluble -- any other insoluble particle as it moves through. The ICRP models for calculating dose to the GI tract -- I won't say they're pretty crude, but they're pretty simple. It's essentially one-half the dose of the contents of that particular portion of an organ, and to try to pretend that we could modify that any finer and increase the dose based on some other principle would be beyond what we're certainly capable of doing, and would be -- we'd be consistent using their guidance, which says use the standard models. So I think it can be handled with the new -- with the ICRP-66 dosimetry model. I don't -- I don't see that as a -- as a roadblock. The trick there, though, is to identify the existence of the hot particle. See, like in this NRDL report, the key

information here is that -- it categorized it, you know, what -- what percentage and what (unintelligible) they have. I don't know that we're likely to -- how would you know that at these sites, and then that becomes a little problematic. How do you --

MR. PRESLEY: Well, I was going to say, you can't -- how do you do that?

DR. NETON: Well, it gets into the classic situation of how do you prove a negative. How do you prove the hot particles didn't exist?

MR. PRESLEY: Yeah.

DR. NETON: And I'm not sure. That -- that's something that we need to try -- we need to address, though.

DR. MAKHIJANI: This is Arjun. It may be that, you know, indirect evidence might help establish that. I -- I -- Ms. -- Billy Smith made a pretty categorical statement there that no one was exposed, or something close to it, to hot particles. Whereas I think the early tunnel re-entry workers, for instance, who got extremely high tritium doses and there were accidental -- there were -- there were mishaps in those tunnels in the early days that I think

do bear some looking into. Now they -- I understand it's covered by an SEC, but because of the nature of the test site work being very episodic in relation to high radiation environments, it does concern the 250-day issue, and so it might be relevant. It may also be relevant for later tunnel re-entries in the -- in the '60s. So -- so I -- I -- I'm not talking about re-entries when there were no mishaps and when things went as anticipated. But -- but it wasn't error-free.

MS. MUNN: No. But Arjun, again, we're back to the -- to the matter of needing to rely on the data itself, the preponderance of evidence, rather than potential scenarios.

DR. MAKHIJANI: Oh -- oh, Ms. Munn, no, I wasn't -- I wasn't talking about creating speculative scenarios. On the contrary. I was just actually agreeing with -- with Jim Neton that, you know, it -- it's difficult to prove a negative and suggesting that there are documented incidents where it may be possible that there were hot particles, and looking at those -- that incident data, it may be possible to determine that. I -- I have always been

uncomfortable relying on CATIs for these kinds of things because for the most part survivors don't know any of this, but -- but I think the incident data might help. So I'm just kind of trying to -- trying to suggest ways in which the speculation might be reduced, at least.

MR. CLAWSON: Well, this is Brad. Wouldn't some of these hot particles be suspended, like the PLUTO test of that reactor, and ROVER? You know, in our tour down there and stuff like that, they had people that were -- couldn't come out of their buildings till after they'd been cleaned up afterwards. You've got the cleanup peop-- don't they have any data on -- on any of this, because you know, John was even saying that they couldn't come out of their trailers till after everything had been hosed down and cleaned up.

DR. NETON: I think that's what Arjun's suggesting is we would look at the existing reports that are out there related to the incidents, either planned or unplanned, and try to help bracket the universe of potential hot particle scenarios, where they -- where they more likely could exist, where they likely did

not exist. Like I suggested earlier, several weight-of-the-evidence approaches is all we've got to go on, and I think -- I can't argue that we shouldn't do that. I mean I think we need to do that.

MR. PRESLEY: Can we put something in here that says that if -- that's going to be done on a case-by-case basis then for the hot particles, and let's get on with this?

DR. NETON: I -- but I'm not going to say every single case by case, but...

MR. PRESLEY: Where you've got -- where you know that there is a known incident --

DR. NETON: Right, yeah, that's -- I would agree with that. We would evaluate -- on a general basis we would evaluate the incidents as applicable to the existence of hot particles.

MR. PRESLEY: Right. Right.

DR. NETON: I think that's fair-- that's reasonable.

MR. ROLFES: We already have done some cases using Varskin in some of our dose reconstructions when we have contamination incidents. I can't remember the site

specifically, but I do remember seeing a dose reconstruction where some Varskin calculations had been done because a hot particle was deposited I believe right inside the gentleman's nose.

DR. NETON: Well, I do think this reactor experiment here, as -- as Billy Smith pointed out, is one of those unique scenarios that has been identified. It was pretty easy and it was studied well. Now the question is are there any other similar things out there that we need to look at, identify (unintelligible).

MR. SMITH: This is Billy. I have a question, and -- and particularly coming from me, it's -- it's sort of a -- my experience at NTS started in 1966 and -- but I was on the weapons test side. I spent an awful lot of time over at Area 400 in 1966 to '68 working on another type of experiment with Project HENRY. But my question is, are the Pan Am records -- has anybody seen any Pan Am records that may have indicated that there were hot particles exposures to people from the NERVA experiments?

MR. ROLLINS: This is Gene Rollins. I haven't -- I haven't seen any indication of that.

MR. SMITH: I -- I can probably check with Martha sometime soon -- Martha DeMarre over at the archives, NTS archives, and see if there are any NTS records that include any of the Pan Am exposures.

Now they did wear the NTS dosimeters, the external dosimeters, at that time. I'm positive of that because I wore those when I was there. But I'm not sure about any contamination records that Pan Am may -- was responsible for keeping at that time, what happened to those.

DR. MAKHIJANI: Yeah, we also suggested a look at the NRDL records, the Naval Radiological Defense Lab records. There are a number of references in that document that we've all looked at now, and they might be helpful -- because the hot particle issue will remain for the reactor -- or re-entry workers, and they might be helpful in -- in sort of giving some idea of who was exposed and when and at which tests and so on.

MR. PRESLEY: Okay. Is that -- go ahead, Wanda.

MS. MUNN: How large a task is that?

MR. ROLFES: I'm sorry?
MS. MUNN: Do we have a feel for it? I was just asking how large a task it would be.
DR. NETON: I would ask Gene and his crew whether --
MS. MUNN: To look at the Pan Am and -- and again, look at the NRDL records as -- as indicators of where one might even have this concern, in an effort to try to put it to bed as to when -- when we do or do not need to incorporate that into our thinking.
MR. ROLFES: Billy, do you have a feel for how long this might take to speak with Martha and go through some of these records to determine whether hot particle exposure could have been significant for any of the reactor tests?
MR. SMITH: I would say it would probably take -- take at least a week to -- you know, to get any indication at all after we get Martha's schedule adjusted to when she could start putting that kind of effort into looking at those records.
But now, you know, the -- the Area 400, which was the area where these tests were conducted, were a rather small subset of the NTS

population, so we're really not talking about a lot of people relative to the numbers of people that worked at NTS. So when you talk about NTS and these rocket experiments, you're really talking about a small number of -- of people.

MR. PRESLEY: Hey, Billy, this is Bob Presley.

MR. SMITH: Yes, Bob.

MR. PRESLEY: You could look at the four -- Area 400 --

MR. SMITH: Yes.

MR. PRESLEY: -- and then look at the incidences that we had up at the tunnels --

MR. SMITH: Right.

MR. PRESLEY: -- and those should be all documented, and then look at the incidents where we had any venting, and that would just about take care of it. Do you agree?

MR. SMITH: I agree. I agree.

MS. MUNN: Will this be an undue personnel burden?

MR. SMITH: Personally, I don't think so.

MR. ROLLINS: Well, Martha DeMarre -- this is Gene Rollins. Martha DeMarre will probably tell you that it is --

MR. SMITH: Yes.

MR. ROLLINS: -- because she's a -- she's a very busy person and is having a hard time just meeting the day to day requests under this and other programs. But she's been very good in the past and she has come through and provided us with a great deal of information. And so that's -- that's one place we're going to probably get a little bit of resistance, but I -- I still feel like Martha will come through because she's a -- she's been very helpful in the past.

MR. PRESLEY: Hey, Billy or Gene, either one, this is Bob. Would that not be pretty well available from the industrial hygiene reports at the test site, especially in the -- oh, from say like '57 on -- if we could get our hands on the industrial hygiene reports.

MR. SMITH: I'm not sure -- this is Billy. I'm not sure what -- what Pan Am's responsibility was, but I'm sure that there was a project report put together for each test of the nuclear rocket engines, and -- and those -- those would have been sent through DOE -- Smithall was the Space Nuclear -- PO -- Project or something like that. They had to report to

NAVU at that time, so I'm sure those things were generated, and that would be part of the historical documents that -- that Martha would have.

MR. PRESLEY: Why don't we see then that -- if she has this readily available, and then go back and ask NIOSH if they have the time and the money to do this.

MR. SMITH: If -- if Mark asked me to do that, I would go over and ask Martha to see what she could come up with.

MR. ROLFES: Yes, and I believe we'll have you do that, Billy, so --

MR. SMITH: Okay.

MR. PRESLEY: Thank you. Okay, we need -- go ahead, Wanda.

MS. MUNN: We understand the -- the difficult part for members of the Board, I think, is trying to identify which of these items is worthy of the amount of time and energy that needs to go into it to track it down. Clearly we want to cover the most directly applicable issues rather than minor issues which might affect a very small number of people in a very small way, but not have a major impact on your

-- your overall program work and the number of cases that are going to be involved. Just a simple issue of everyone's time, energy and -- and -- it's hard for some of us to lose track of the fact that it's all taxpayer money, so it's -- it's helpful when we can identify what's really of large enough magnitude to impact a variety of -- of issues rather than just a single minor issue that won't affect a POC for more than one or two people. So thanks, if you can get it done.

MR. SMITH: This is Billy one more time. The person who was -- who was directly responsible for the health and safety program at Pan Am when some of these experiments took place was Bruce Church, and Bruce is a person who -- I don't know whether or not he's been interviewed or what information you can provide, but it would seem to me that having a discussion with Bruce would be invaluable in providing some -- some perspective on this issue at NRDS.

MS. MUNN: Can we do that, Mark?

MR. ROLFES: Yes, definitely. I think we should set something up, Billy. I think it'd be a good idea to speak with him if he's

available.

MS. MUNN: We've done such a good job of covering --

MR. PRESLEY: Yeah.

MS. MUNN: -- people otherwise.

MR. PRESLEY: What's that guy's name again, Billy?

MR. SMITH: Bruce W. Church. As a matter of fact, he was a health physicist for Pan Am at the time when this took place and he ended up being in charge of the entire radiation protection program at NTS in his later years. He was at -- he was a Fed when he retired.

MS. MUNN: So is he still in the area, easily available?

MR. SMITH: I think Bruce is up in Utah somewhere. I'm -- I'm sure he'd be easy to find.

MS. MUNN: Good.

DR. ROESSLER: I know him. I think I can look him up on the Health Physics membership --

MS. MUNN: That was going to be my next --

DR. ROESSLER: -- directory and see where he is. In fact, I can do it sort of right now.

MS. MUNN: Wonderful.

DR. MAKHIJANI: So -- so -- so Mr. Smith, you are going to interview him, is that -- is that --

MR. SMITH: No. No, no, no, no. I have a conflict because of my involvement in the health and safety program (unintelligible) --

DR. MAKHIJANI: Oh, so somebody from ORAU will interview him.

MR. SMITH: Somebody else will be interviewing --

DR. MAKHIJANI: Maybe Gene.

MR. SMITH: -- Bruce.

DR. MAKHIJANI: We'd just like to see the interview record when it's done.

MR. PRESLEY: Arjun, I'm sure they'd be more than happy to pass that on.

DR. ROESSLER: Bruce --

DR. MAKHIJANI: Yeah. No, I say that because there -- there still -- from the last time -- I mean this is the last item, but I'm might as well say it since it's come up. There are still interview records that -- that we don't have, the -- the Brady five hours of interviews, and then there are two other interviews, Arnt -- Arnt* and Smith, that are

now references in the site profile, that are not available so it's -- it's sort of impossible to track this stuff, or respond to what's going on if we -- if we don't have the record.

DR. ROESSLER: I got -- I was a little slow there, but Bruce Church is listed in the Health Physics membership list. He's in Utah, and I've got phone numbers and an e-mail address, so I think he's probably quite accessible. I can give -- whoever wants them, I can give you that later.

MR. ROLFES: I'll coordinate with Gene to get something set up then.

MS. MUNN: And -- and what is the issue with the other interviews that SC&A doesn't have yet? Was that classification issues?

MR. ROLFES: These were passed through an authorized (unintelligible) --

MS. MUNN: All right.

MR. ROLFES: -- classifier.

MS. MUNN: Fine.

MR. ROLFES: Gene, has Laurie mentioned, or Cheryl, do we know anything about the status of those records or have we heard anything back?

MS. SMITH: This is Cheryl. I don't quite -- records -- the interview records or when the --
MR. ROLFES: Yes, Gene's -- as I recall, I believe Laurie Raunt* was going to have those -- those interview records passed through an authorized derivative classifier in Las Vegas --
MS. SMITH: Okay.
MR. ROLFES: -- and I didn't know --
MS. SMITH: Yes, I -- I don't know what the status on that is.
MR. ROLFES: Okay.
MS. SMITH: I know that she put them together, all our e-mails and -- in a long file and it was sent to us, and that was some time ago, so if you would like I could check on it.
MR. ROLLINS: This is Gene Rollins. I don't know what the status of that is, either. That -- in fact I'm -- Cheryl, I don't even know if the classifier is the same person that we used before, but she was very helpful. We'll -- we'll check on that and get back to you.
DR. MAKHIJANI: Yeah, Gene, there -- there are a number of interviews listed here on the last response, 25, and then I was just in

preparation looking at your -- looking at your revised external site profile which you issued a couple of months back and there are two interviews, Arnt and Smith, 2003 and 2004, that I couldn't find. And it's kind of a general request. I mean if -- if -- if things are -- are available to make public and if they're cited like this as personal communications, if a record could be put on the site query database or the O drive or something that -- this wouldn't come up again and again.

MR. ROLLINS: This is Gene Rollins. Cheryl, that sounds like a -- an action for you, Cheryl, since you and Laurie are the ones that are being cited. And typically when we do these TBDs, all the citations are sent with the revisions, so it could be they're already on the O drive.

DR. MAKHIJANI: Okay.

MR. ROLLINS: Bob, this is Gene Rollins. I'm going to have to leave this discussion for about 45 minutes or so, but I will sign back on and let you know when I'm back -- back onto the discussion, but it looks like the next few items might be a good time for some discussion

with Billy Smith.

MR. PRESLEY: Gene, thank you very much. We will catch you when you get back.

MR. ROLLINS: I'll be back in about 45 minutes. Thanks.

MR. PRESLEY: Okay. All right, we're down to response 2(b).

DR. MAKHIJANI: 2(b) did you say?

MR. PRESLEY: Uh-huh. I think we've about beat 2(a) to death. We've still got some stuff that needs to be done on that, as everybody's heard. The action on that, add guidance to Chapters 5 and 6. I think that's kind of -- we'll do that, but we also have some other things to -- to add to that now, so...

DR. MAKHIJANI: Mr. Presley, I think 2(a) through 2(f) were generally covered because --

DR. NETON: Yeah.

DR. MAKHIJANI: -- some of them are complex-wide and some of them are specific to various areas. But as I see it, I think we've sort of covered the waterfront on these. Do you agree, Jim?

DR. NETON: Yeah, I agree. I was just about to say the same thing.

MR. PRESLEY: I just want to make sure everybody's got a chance to say something.

DR. NETON: These are all related to (unintelligible).

MR. PRESLEY: Right.

MS. MUNN: And my concern is that when we have these complex-wide issues that we don't close out what we're doing here until we've pretty much put that to bed, because otherwise we have this same process every time we -- the issue gets raised at every other site.

MR. CLAWSON: Well, and -- and we were looking at some way of being able to track this, of -- of where we're at, because we've signed off quite a few of these because they're a complex-wide issue.

MS. MUNN: Yeah, this -- this is still another topic that has to --

DR. NETON: I think we need to differentiate, though. It's certainly complex-wide, but as we talked about, there are specific issues here that need to be identified for NTS.

MS. MUNN: Right.

DR. NETON: When I was speaking of complex-wide issue, I was speaking more of generic guidance

to dose reconstructors on how to handle data if they had it -- you know, these type of data. I don't know that we have something that says, you know, if you have identified hot particles, then you shall use a one square centimeter area of skin. I would suspect they would do that, but you know, without anything in writing and documented to that effect, I -- you couldn't guarantee that it would happen consistently. Or the fact that the GI tract model, at least in my opinion at this moment, is acceptable for dosimetry of hot particles as they move through that -- that part of the system. Those are just sort of overarching sort of white paper policy issues that we need to put in place --

MS. MUNN: Yeah.

DR. NETON: -- which are separate from the site-specific things.

DR. ROESSLER: Is that something that should come up at the next Board meeting, those issues --

DR. NETON: Yeah.

DR. ROESSLER: -- plus you mentioned the risk model for the --

DR. NETON: The risk model for the skin

dosimetry --

DR. ROESSLER: Seems like that should --

DR. NETON: -- issue's a little problematic in my mind. I mean I think we have to be conservative in applying the current risk model.

DR. ROESSLER: Uh-huh.

DR. NETON: We need to -- we need to take a position on that.

DR. ROESSLER: Uh-huh.

DR. NETON: And you're right, Gen, there are a number of issues that at the last Board meeting were brought up -- I think by Bob -- that are overarching issues, and that on -- that's covered on that list that we intend to provide the Board an update as to status of those overarching issues, at least -- at least identify them and where we are. Some of them are just beginning to be identified, some are going through closure, like the oro-nasal breathing issue.

DR. ROESSLER: On the risk model I think you should -- it should be put on the record that what you are using, if you feel that it is a conservative model, and provide the evidence

for that. I agree, I think it is a conservative --

DR. NETON: Right.

DR. ROESSLER: -- claimant-friendly model.

DR. NETON: We do, too, but we'd have to have some scientific, you know, citations we could put in there and document it.

250 DAYS

MR. PRESLEY: Comment three, we've gotten into this on two. SC&A has agreed with what NIOSH's interpretation of this are, except when you get down to 2(b) -- or 3(b) where we get into this 250-day issue. Jim, will we discuss that further on down through here?

DR. NETON: Now where does 3(b) get into the 250 days (unintelligible) --

MR. PRESLEY: 3(b), telecon (unintelligible) --

MS. MUNN: Page 6.

DR. NETON: It says --

MR. ROLFES: John Mauro has identified --

DR. NETON: Yeah.

MR. ROLFES: -- (unintelligible) of those.

DR. NETON: Time period will affect 250-day issue. What time period are we referring to there? Refresh my memory. (Reading) TBD will

(unintelligible) conflict with large hot particle (unintelligible). I'm not quite seeing the connection between the response and the time period here. (Unintelligible) SEC, yeah.

DR. MAKHIJANI: Yeah, Jim -- Jim, I -- I think that John was -- was concerned about how the high doses from episodic exposures, or potentially high doses, would affect the 250-day issue. But I think -- I think that should be -- it should be covered in that separate report that's going to be discussed on Friday.

DR. NETON: Yeah, I think that would be -- that would not be relevant to this discussion. This is a site profile issue and the other one's an SEC issue.

MR. PRESLEY: Right, the other one's SEC.

DR. MAKHIJANI: Well, the only way it's relevant is if you can calculate the dose. Right? I mean --

DR. NETON: Right.

DR. MAKHIJANI: -- if you can do that, then -- then it's -- then it's relevant here. Otherwise it doesn't belong here.

DR. NETON: Interestingly, this has always been

an interesting issue, is that if -- if a hot particle on the skin became a dose that was non-recon-- could not be reconstructed, that would mean skin cancer couldn't be reconstructed -- which are non-presumptive cancers for SEC purposes -- and that would bring in the 22 cancers that are not related to skin, so that's another twist that we need to (unintelligible) worry about, but...

MS. MUNN: We need to get clearer on that one.

DR. NETON: Yeah, I think we'd have to have our OGC folks help us out there, but...

MS. MUNN: Well, I was -- I was a little puzzled by the statement that "may solve both problems during literature review," and I -- I thought our -- who's doing the literature review?

DR. NETON: Well, we're --

MR. ROLFES: This was John Mauro's comment, so I would believe that it was SC&A.

MS. MUNN: Okay.

DR. MAKHIJANI: Sorry, are we -- we will -- we will touch on this in our 250-day report briefly, in -- in the December report -- in the report that you'll see this Friday, but -- but

probably more at length prior to the Board meeting because -- well, frankly, had hoped to see something from NIOSH on the hot particle question by now but we haven't seen anything yet, so we'll have to discuss internally how we -- how we handle it since this has been in -- in NIOSH's court. I guess we'll have to take it up in some way as it concerns the 250-day question.

MS. MUNN: Yeah, this is -- for -- for us here, Arjun, in this group, it poses kind of a problem because it sort of overlaps into the -- the Friday group, which is not the same batch of individuals.

DR. MAKHIJANI: Right.

MS. MUNN: We -- we have to -- we have to sort of balance that back and forth.

DR. MAKHIJANI: Right.

MS. MUNN: Thank you.

DR. BEHLING: Arjun, this is Hans, I just have a ques--

MS. SMITH: Excuse me, this is Cheryl Smith. Steve Merwin* found out on the internet yesterday a DOL bulletin, 06-16, and in that bulletin it indicates that we are to -- if

there's evidence that an employee was present on site at the NTS for 24 hours in a day for 83 days, the employee will have the equivalent of 250 workdays and will meet the 250-workday requirement.

MS. MUNN: Yeah, so DOL has accepted that as policy.

MS. SMITH: Correct.

MS. MUNN: Yeah, right.

MS. SMITH: Okay.

MR. PRESLEY: That horse is --

DR. NETON: Yeah, we knew that was coming.

MR. PRESLEY: -- put back in the barn.

DR. NETON: I guess I'm still not seeing the connection here. I mean if we can do hot particles, we can do it in the site profile. We talked about identifying areas where hot particles may have existed. We talked about if there were hot particles we would calculate a dose to one square centimeter of skin using Varskin. I mean those methods are all there. I'm not sure --

MS. MUNN: Well, we may have captured something in this comment that wasn't --

DR. NETON: But Arjun has been suggesting, and

I agree with him, that may be -- that's an issue for Friday that -- that talks about how large these doses may have been from an instantaneous or short-term exposure, less than 250 days. That's -- that's -- that appears relevant, but I don't know if that needs to be brought into this discussion.

MS. MUNN: Yeah.

DR. BEHLING: The question I have is why is it unique to hot particles? You can have a single inhalation exposure that does not involve hot particles and have a very large dose associated with that incident that is no different from a single large dose of a hot particle, so --

DR. NETON: Well, but --

DR. BEHLING: -- (unintelligible) the issue's not unique to hot particles.

DR. NETON: But if -- if that is the only scenario that could get you to that high dose...

DR. BEHLING: Well, you can inhale an incredible amount of plutonium in a single event --

DR. NETON: But did that happen here at NTS. That's the question.

DR. BEHLING: No, no, but I'm --
DR. NETON: That's what I'm saying.
DR. BEHLING: There's nothing unique about this --
DR. NETON: Well, I --
DR. BEHLING: -- (unintelligible) hot particles.
DR. NETON: -- understand that, but what we're saying here is, relevant to NTS and high exposure scenarios that would potentially get a class in with less than 250-day exposures, it appears that SC&A is suggesting that the hot particle issue is one of those high -- high potential scenar-- exposure scenarios. I'd be interested to hear what -- what's talked about on Friday.
MS. MUNN: Yeah.
DR. NETON: Is that right, Arjun? I mean that's sort of the connection I (unintelligible) --
DR. MAKHIJANI: Well, you know, I -- we haven't -- I had -- I'm -- I'm drafting this with -- with a couple of other people, and where I am right now is I haven't said anything about it because, as I said, I was hoping to see

something -- something from NIOSH/ORAU team about this but -- but we haven't. And so now I have to go back to the drawing board a little bit and -- and talk with John about -- I don't think we'll say very much on Friday, but I hope that we'll discuss it some and be able to present something to the Board, one way or another, so -- so at least they can decide that it is relevant or not relevant. And -- and I don't have an opinion about this at this stage 'cause...

MR. PRESLEY: Okay. Then we will go on down through response 3(c) and get into respon-- comment four. And Gene has --

DR. NETON: Okay, this is an area where -- this is -- this is truly an overarching issue. This is -- let me read the comment here (pause). This is -- this is truly an overarching issue that we've been working on for some time now, and our latest projection is that we'll have a completed report not -- by January. We have an outside contractor working with us on this. They've done an exhaustive review of the literature on this. There's many more papers out there than I was able to find that they've

located, and they're putting their heads together and coming up with -- well, there's some writing that the -- the literature for us, and then NIOSH will make an informed opinion at that point about how we're going to do this.

MS. MUNN: Good.

MR. PRESLEY: That'll be great.

DR. ROESSLER: So this is coming up in --

MS. MUNN: January.

DR. ROESSLER: -- January?

DR. NETON: That's -- that's what --

DR. ROESSLER: And who is the outside contractor?

EG&G

DR. NETON: EG&G is working on this for us, (unintelligible) and others, and they're -- they're real go-getters. They've pulled out a lot of literature, a couple of feet of literature on this topic. But there's some interesting work out there. This of course is relevant in the context of the Bethlehem Steel site profile review and in respiration at steel mills, so we've actually located these documents of physiological work that's been done on these steel mill workers and such. But

that doesn't address the fundamental issue of oro-nasal breathing, which is -- there's a certain percentage of the population that breathes through their mouth, so I think it's -- it's fairly high, it's somewhere around 25 percent. So then the question is would NIOSH default in every single dose reconstruction to inhalation through the mouth as the mode of entry, and in many cases that will increase the dose -- lung dose for the intake. And should that be our default position or should we go and try to poll all of these -- all of the claimants to find out if they were mouth-breathers. I think that would be just an impossible task. Or should we incorporate this into the uncertainty, or is it already addressed in the overall uncertainty of the dosimetry model itself. There are some papers out there that suggest -- and I think I've mentioned this before at Board meetings -- that the -- the variability -- the uncertainty -- distribution of breathing rates among regular breathers is equal to the distribution of the variability among mouth-breathers versus regular breathers such that the uncertainty --

by making one correction you don't fix the problem because the un-- the overall uncertainty is large. And so we have to decide whether we're going to either make it a default position; try to poll workers and find out what they really were breathing, oral or nasal breathing; or try to incorporate the oro-nasal breathing into the overall uncertainty of the dosimetry models and such. Those are -- in my mind those are our three options and -- that we'll weigh in on in January. Not an -- not an easy issue. It's taken a while.

MS. MUNN: No, it isn't. But I will certainly be pleased to see it put to bed.

DR. NETON: One also has to consider this in the context of this is just one variable of many in the dose models. You have variability in the size of the individual lungs themselves, so should one now all of a sudden account for the fact that a woman who's petite has an 800 gram lung, versus a male who may have a 1,500 gram lung, and it brings into play all these issues. And we're going to try to have some sort of a nice scientific discussion of these issues and what this really means overall in

the dose reconstruction process.

DR. ROESSLER: So is the contractor then working on all of these issues or just the percentage of people who are --

DR. NETON: No, no, they -- they pulled out all the papers on many of the issues that (unintelligible) identified, but it of course remains NIOSH's responsibility to consolidate these into an opinion. They -- they certainly summarized blocks of information for us, but (unintelligible).

MS. MUNN: That's good. I can see that would be a -- an extremely difficult literature search.

MR. PRESLEY: Somebody's --

DR. WADE: We have a bad buzz.

MS. MUNN: Ah, someone did something nice.

MS. HOMOKI-TITUS: Thank you.

DR. WADE: The world is still out there with us. Liz, are you with us?

MS. HOMOKI-TITUS: Yes, I am. Thank you.

DR. WADE: Okay, just to make sure the world is with us. Thank you.

DR. NETON: Comment four I think needs to be -- needs to remain as a complex-wide issue and we

will provide an update as to where we are at the December Board meeting.

MR. PRESLEY: December?

MS. MUNN: Updating.

MR. PRESLEY: Is that just an update, and then February --

DR. NETON: We don't plan to be done until January. It will be on the list of issues to have a status update.

MS. MUNN: Excellent.

MR. ROLFES: Bob, if it's all right with you, I'd propose that we skip past comment five until Gene Rollins returns.

MR. PRESLEY: I think that's great. No problems whatsoever with that. Anybody else have a problem?

(No responses)

We'll go back to comment five when Gene comes in -- comes back.

Okay, six has to do with the average air concentration values.

MR. ROLFES: I think this will also tie in to the resuspension issues, as well.

MR. PRESLEY: Yeah.

MR. ROLFES: I think that Gene would probably

be best to discuss this issue, so --

MR. PRESLEY: I think five and six are (unintelligible) --

DR. MAKHIJANI: Yeah, Mr. Presley, Mr. -- the issue seven also is --

MR. PRESLEY: Yep, seven's the same way.

DR. MAKHIJANI: -- is the same way.

EXTERNAL DOSE DATA FOR 1963 AND '66

MR. PRESLEY: Okay, get down to eight. Okay, claimant issue -- or comment eight is where the external dose data for 1963 and '66 is not claimant-favorable. The response was accepted on the external dose, and work was completed pending a sign-off of Chapter 6, Revision 00PC2. Has that been done yet?

MR. ROLFES: The work was updated. I believe we received some tables of external dose data from Martha DeMarre and have incorporated into a draft of our Nevada Test Site profile, although I do not believe it has been officially approved by NIOSH yet. Is that -- is anyone out there that can comment on that -- Cheryl?

MS. SMITH: This is Cheryl. Yes, it is still -- there's some modifications. There was a OCAS

comment that came back asking for 95th percentile, so the information is being presented in a different form, with slightly different guidance. And hopefully that will be the math-- the mathematics of it was done fairly recently. It's in the process of being checked, and hopefully we'll have the response to OCAS by the end of the week.

MR. PRESLEY: Okay.

MR. ROLFES: Thank you, Cheryl.

MR. PRESLEY: Are y'all also going to get SC&A a copy?

MS. SMITH: Sure, we can do that.

MR. PRESLEY: Arjun?

DR. MAKHIJANI: Yes, Mr. Presley, I -- I presume that it will be posted in some way or circulated in some way when it's done.

MS. SMITH: Well, ye-- it'll be part of the TBD, it'll be a page change to the Rev. 0 TBD.

MR. PRESLEY: Okay.

DR. MAKHIJANI: Now you posted the Rev. 0PC-1 in June.

MS. SMITH: Correct.

DR. MAKHIJANI: So -- so you'll post a page change to that?

MS. SMITH: Correct, there will be a page change, and that'll -- I -- that's -- that's part of the document control process.

DR. MAKHIJANI: Yeah.

MS. SMITH: I mean it's still -- in a sense, until OCAS signs off on it, it's, you know, not official.

DR. MAKHIJANI: Yeah, but Mr. Presley, I -- I think that -- that the actions that -- that NIOSH is taking on this are -- are fine.

MR. PRESLEY: Okay, that's good. Okay, go to nine, and this is lack of environmental external dose data for '68 through '76, and that has been completed. Does anybody have any comment to -- before we move on?

(No responses)

All right.

MS. MUNN: I'm wondering about that comment from the teleconference, the Board has no mechanism to prove this is complete. I don't know what we have to have --

MR. PRESLEY: Yeah.

MS. MUNN: -- exactly.

MR. PRESLEY: I don't, either.

MS. MUNN: If it's complete, it's complete.

MR. PRESLEY: Somebody says it's complete, we go through and say the Board says it's complete. That, to me, is the -- the action.

MS. MUNN: Yeah, it is to me. I'm not sure why we have that -- why I asked that question, that -- or why it's on there that way. I guess -- I think -- my memory is that this dates back to the issue we've already touched on, the fact that we don't have any mechanism set up for tracking actions that -- that we've initiated, that we have on a matrix, that we show on the matrix as complete, but then we don't have any tracking mech-- I think that's what that was about, so --

DR. MAKHIJANI: Ms. Munn, may -- may I ask a question or make a suggestion? I don't know whether Jim Neton or ORAU may agree with this, that it would make this easier, is -- is when we go through this process and, for instance, like that page change is done, if on the page change it indicates that it's a response to such-and-such item, or such-and-such discussion. Then we could all see that it's complete and there wouldn't be a question. Right now I don't think that when the TBD is

changed, say in response to matrix issues that I -- that I see that it refers to those issues. It -- it might make tracking sort of very simple.

MS. MUNN: Yeah, it would for us. It would probably complicate things for others. The thing that concerns me about that suggestion, Arjun, would be that these are public documents. And if we're going to reference something like our matrix, then we're going to have to do something like put the matrix -- matrices out there somewhere. And even though they are public documents and can be obtained, it -- it really kind of muddies the water to have our -- our working documents that -- that are -- they're easily misconstrued, I think. There are statements on the working documents are -- are easily misconstrued. But I -- I guess -- I -- I'd prefer to have us think on that for a little while and think about how it would be best for us to -- I guess I would prefer to see a different table entirely as a -- as a working document for the working groups. That document could identify the matrix item by name and by working group, and identify that it

was closed. That, I think, would be -- certainly for me, as a member of several working groups, that would be easier for me to follow than trying to do so on the -- when the page correction occurs or when the document correction occurs.

DR. WADE: Right, and this is Lew Wade. We -- we've approached this issue several times, but we really haven't finalized it. I think when the Board meets in December we really need to --

MS. MUNN: Address that.

DR. WADE: -- put a procedure in place that we'll follow on that.

MS. MUNN: Yeah, get it to the ground.

DR. WADE: So I'll see that we have that as part of our discussion in December.

MS. MUNN: Thank you.

MR. PRESLEY: Do we really need this comment then from 9/6/06 on here?

MS. MUNN: Well, we have both of them there. It may --

MR. PRESLEY: Well, it's confusing. It says that, you know, the action -- the work is completed, and then we say that we have no way

or mechanism to provide us -- that this is complete.

MS. MUNN: Yeah, maybe we should drop both those off there since, as everybody agrees, it is a -- it is a project-wide issue that we have to address and the whole Board will have to address it. We all know it.

MR. PRESLEY: Okay, comment ten, TBD does not provide any guidance for pre-1963 external environmental dose. It's been marked as work complete pending sign-off of Chapter 6 revision 00PC2.

MS. MUNN: Yeah, that's the one they just talked about --

MR. PRESLEY: Right.

MS. MUNN: -- and so we're -- it's done.

MR. PRESLEY: And so that right there, to me, has been taken care of.

MS. MUNN: Yeah.

MR. PRESLEY: That correct?

MS. MUNN: Correct.

DR. ROESSLER: And the comment should come off then about data integrity and reliability.

MS. MUNN: Yeah.

MR. PRESLEY: Can we take that off? Can we

delete that, Wanda?

MS. MUNN: Yes, I would suggest that we do, on both that one and comment nine, because that...

CORRECTION FACTORS FOR EXTERNAL ENVIRONMENTAL DOSE

MR. PRESLEY: Thank you. Comment 11, correction factors for external environmental dose. There's been a resolution developed with -- in response to 2(b). The action on this is development of correction factors is in progress. Results will be incorporated in Chapter 6, Revision so-and-so. Now this is an ongoing issue, is it not?

MR. ROLFES: Yes, that's correct. I believe Richard Griffith from ORAU -- he's not available today -- but he has been working on correction factors for -- for various geometries. Cheryl, could you please give us an update on Richard Griffith's correction factor work?

MS. SMITH: I'd -- I basically cannot. I know he has been working on it. I'm kind of wondering how does this affect our -- our blanket use of AP geometry.

DR. NETON: Well, I think -- I think AP geometry is a default unless one can identify

other unique exposure scenarios at a specific site.

MS. SMITH: Okay. Okay, so we would be allowed to -- to --

DR. NETON: Oh, sure, yes.

MS. SMITH: -- (unintelligible) use this in our dose reconstruction.

DR. NETON: Yeah, this is not unlike what happened at Mallinckrodt where we -- you know, we proposed to use AP geometry and then SC&A identified, you know, a situation where if you have a spill contamination on the -- on the ground -- a planar source on the ground --

MS. SMITH: Sure.

DR. NETON: -- you know, the response of a badge on your chest pocket is not going to be the same as if it was an AP exposure. This was identified at the last Board meeting as a -- as a complex-- an overarching issue. I'm not convinced that it really is. It is -- it certainly affects all sites, but it -- it's such a site-specific situation. I mean every site has the potential for some unique exposure scenario, whether it's overhead piping or spills or some machine that they were using

that was unique. I think the -- the answer there is we just need to identify -- and be very careful for each site that we identify those scenarios and account for them in our dose reconstructions, with the default being AP geometry unless we can show otherwise.

DR. MAKHIJANI: Jim --

DR. NETON: Yeah.

DR. MAKHIJANI: -- it may -- you know, since you already did the calculations for -- for Mallinckrodt, I think one of the things that does come up is -- is that same scenario with the planar source below the worker. And it may be useful, since you've already done the calculation -- I don't know, maybe the dose reconstructionists will correct me -- may be useful to have, you know, a 2-page TIB that says when you have a --

DR. NETON: Right.

DR. MAKHIJANI: -- job situation like this, use this correction factor.

DR. NETON: That's a good point 'cause I think the TIB right now is specific for Mallinckrodt.

DR. MAKHIJANI: Yeah, right.

DR. NETON: And I'm not -- I'm not sure we

wouldn't use this in comment 11. I don't really know what they're doing right now, but it's a good point. We could have a generic TIB that would say for these somewhat common exposure scenarios like a planar source on the ground or overhead piping or, you know -- the two or three that we've done already, we could put it in there and say use this. It's a good point.

MR. PRESLEY: So we can say that NIOSH will develop a separate TIB for this item?

DR. NETON: Well, I wouldn't hold up resolution of this comment --

MR. PRESLEY: No.

DR. NETON: -- for that. I think that -- that falls maybe into the overarching issues where we would make it easier on dose reconstructors if we develop a generic TIB for -- (unintelligible) call -- alternate geometries. I'm not sure I'd want to tie that to this comment resolution 'cause this -- this is just -- really ground contamination I think is what's discussed here, and I don't know why we couldn't just adopt -- adapt the Mallinckrodt approach. We did a full Attila run on that.

MS. MUNN: We had pretty general consensus about receiving that direction with Mallinckrodt, as I recall.

DR. NETON: Oh, yeah, I think...

MS. MUNN: So...

DR. NETON: But I think that we could just move forward and correct this for this particular situation, but then leave the badging geometry issue on the overarching issue list.

MS. MUNN: Uh-huh.

DR. NETON: And I think the resolution of that comment would be to have a generic TIB to talk about a couple of these alternate geometries.

MS. MUNN: Obviously existing things.

DR. NETON: Yeah, things that make sense.

MR. PRESLEY: Okay.

DR. MAKHIJANI: I agree with that. I think that will just solve this problem faster since there's a very specific issue here to be solved and we already have the solution.

MR. PRESLEY: Okay, can we say that -- that on this particular comment then that no further action will be needed other than your revision to Chapter 6?

DR. WADE: Yes.

MR. PRESLEY: That an overarching --
DR. NETON: I would just say revise Chapter 6, and then maybe just make a parenthetical note that NIOSH will address this as a complex-wide issue with a -- with a -- development of a TIB. So that wouldn't -- that TIB would not need to be issued to close this particular comment.
MR. PRESLEY: Right.
DR. NETON: But I agree with Arjun, it will -- it will save time down the line if we do address this with a TIB that gives the dose reconstructor some flexibility just to pull off the shelf the correction factors.
MS. MUNN: Okay, that's -- but for this item there's no further action by the -- by this workgroup. Right?
DR. NETON: Well, other than to verify the closure that we actually did the revision --
MS. MUNN: Chapter 6 is in revision.
DR. NETON: It's not done, it's in revision.
MS. MUNN: But it's in revision.
MR. PRESLEY: In revision.
MR. CLAWSON: We're back to the thing of tracking.
DR. WADE: We go there often.

DR. NETON: I think I wouldn't close it until you've at least heard from us that we've got Chapter 6 revised.

MS. MUNN: We'll just indicate that it's still in progress.

MR. PRESLEY: Okay, what I did is I've got NIOSH will address this with a TIB/no action except to accept Chapter 6. Is that correct?

MS. MUNN: Sort of.

MR. PRESLEY: Sort of?

DR. MAKHIJANI: Mr. Presley, I think -- I think the specific thing that -- that Jim was suggesting there is to incorporate the Mallinckrodt calculation into Chapter 6. That would be NIOSH's action, and then the separate action on the TIB.

DR. NETON: Yeah.

DR. MAKHIJANI: Which is not connected to the NTS resolution.

MS. MUNN: Yeah.

MR. PRESLEY: Okay, so you -- do you agree to do that?

DR. NETON: I might want to agree exactly to -- I'm sure the Mallinckrodt works, but I -- I'd leave it up to the technical people to look at

it and make sure it's the same fit. I can't imagine it wouldn't be, although we may have limited the size of the contamination around the worker -- we -- we might need to look at it to see if Mallinckrodt is a perfect fit.

DR. MAKHIJANI: Yeah, I agree, Jim, now that you mention it, I think it was a restricted geometry which you're going to have to look at. I think you -- you'll have to redo the calculation.

DR. NETON: Yeah. We may -- we may have to look at it --

MR. PRESLEY: Or come up with a separate calculation?

DR. NETON: Yeah.

DR. BEHLING: What is the assumption -- energy -- photon energy assumptions?

DR. NETON: For Mallinckrodt? I don't remember.

DR. BEHLING: I don't (unintelligible).

DR. NETON: Yeah. Good point, too. I think --

DR. BEHLING: When you look at fission products, I remember looking at the energy spectrum from fresh fission product, and they have three discrete areas. There's the low

energy and there's one that's near the 800 keV and then there's one that is between one and two, which -- which -- if you really deal with very high-energy photons, an infinite planar source would yield a DCF that's basically unity, and therefore you could default to unity and get this whole thing out of the way.

DR. NETON: I think we need to do some modeling here yet and -- I think the development of correction factors is in progress is still a more --

MR. PRESLEY: That's going to come out --

DR. NETON: -- (unintelligible) response.

MR. PRESLEY: That's going to really come out in Chapter 6. Correct? And so until -- until you all get that out and we accept it, everything sets on hold.

DR. NETON: I think so.

MR. PRESLEY: Okay.

DR. NETON: I think we've got some ideas of starting points, but I don't know really what's been done --

MR. PRESLEY: Okay.

DR. NETON: -- (unintelligible) overall focus.

MR. PRESLEY: Anybody else have anything else

before we go to 11(b)?

MS. MUNN: No, but -- you are going to put in that little parenthetical calling out that possible separate TIB in order for generic alterna-- (unintelligible) geometries as a complex-wide issue.

MR. PRESLEY: As a complex-wide, I -- I said -- what I've got in here is NIOSH will address this with a TIB, no action except to accept 6, Chapter 6, and we need to -- when it's revised.

MS. MUNN: Well, I guess what I thought was happening was that they would attempt to address the generic issue with a TIB, but this particular one will not be waiting for that.

DR. NETON: Right.

MR. PRESLEY: Right.

MS. MUNN: This particular decision on this site will -- will look at -- at previous decisions that have been made and follow from there.

MR. PRESLEY: Okay.

DR. NETON: Did you get that in one sentence? That'd be great.

MR. PRESLEY: No, I don't have it in one sen--

MS. MUNN: Twenty-five words or less.

MR. PRESLEY: Ray's going -- Wanda's going to put that down on hers, so --

MS. MUNN: Yeah, okay.

MR. PRESLEY: -- it can be that compact.

DR. MAKHIJANI: Mr. Presley, I also have notes and I'll share them with you.

CORRECTION FACTORS

MR. PRESLEY: Thank you. Oh, 11(b), on this we -- again, we get back to response 2(b), and the action on this was develop the correction factors and the progress. All ri-- and again this has to do with Chapter 6.

DR. NETON: I'm a little confused as to what this is referring to. NIOSH agrees to develop external dose correction factors for angle of incidence when it is not normal to the badge.

MR. PRESLEY: That's where we were discussing where the badge was at the waist or where the badge was at the chest or around the neck and...

DR. NETON: Then this refers back to --

MR. PRESLEY: 2(b).

DR. NETON: -- response 2(d).

MS. MUNN: Uh-huh.

MR. PRESLEY: I mean 2(d), not 2(b).

DR. MAKHIJANI: I -- I do not know why this refers to response 2(d).

DR. NETON: Well, it's -- it specifically -- you know, this is gonads, the prostate. I've got the original matrix with me that refers to the page of the review -- correction factors for external -- it says here correction factors for external environmental dose due to geometry of organ relative to badge and angle (unintelligible) dose conversion factor needs to be developed. So environmental dose. Is this still referring to the planar contamination issue again? I mean --

DR. MAKHIJANI: I -- I don't know. I -- I actually -- let me see, am I on mute?

DR. NETON: No, you're okay, Arjun. I can hear you.

DR. MAKHIJANI: I actually -- I'm a little puzzled by this item and why -- why it's a -- why it's a separate item, because this is -- it seems like the same as 11(a).

DR. NETON: Yeah, as a matter of fact I'm looking at the actual review you guys did. It says the organ for which doses are being estimated relative to the position of the

external radiation source -- that is organs closer to the ground -- will tend to get a larger dose than those far away, so the organ-specific dose estimation -- this is the same kind of thing, really.

DR. MAKHIJANI: Yeah, I -- I think that when you consider 11(a) you can consider 11(b) part of it. I do not remember why this refers back. I guess -- I guess you'll have to ask Gene why it refers back to 2(d) because it's never come up. I guess I missed that piece of fine print. It says that in 11(a) also, and I also don't understand that in relation to 11(a).

MS. MUNN: Well, but 2(d) is talking about the issue of beta/gamma dose to the gonads and possibly prostate being evaluated in light of the dose estimating...

DR. NETON: Yeah, here's -- here's -- I've got a little more intelligence on page 71 -- I'm sorry, Wanda.

MS. MUNN: No, go ahead.

DR. NETON: This has to do with this whole AP and -- and the --

MS. MUNN: Yeah.

DR. NETON: -- the geometry, and it's

acknowledged in the review that the adoption of the AP geometry for this exposure is claimant favorable for photon energies above 250, positive bias around 20 percent will be seen with respect to the rotational geometry, but then they argue that for best-case dose estimates, NIOSH has to correct for the general dose conversion factors published in the procedures.

Boy, that's -- we -- we could I guess argue that that's as far as we're going and we won't be able to do any better than that and that's best case. I mean I don't know. I guess you'll have to leave this one open, now that I understand it better, but I would get the reference to 2(d) out of there.

MS. MUNN: Yeah, but it appears to be.

MR. PRESLEY: It's still -- I believe it's part of (d).

DR. MAKHIJANI: I think this occurs on page 71 of our review --

DR. NETON: Right, that's what I just read.

DR. MAKHIJANI: -- and I'll -- we might need to go back to the fuller explanation 'cause sometimes these short things get so cryptic

that --

DR. NETON: Right.

DR. MAKHIJANI: -- it's hard to figure out what the original point was.

MR. PRESLEY: Well, it says --

DR. NETON: Well, the bottom line says we're going to develop correction factors --

MR. PRESLEY: Right.

DR. NETON: -- but I'm not --

MR. PRESLEY: Right.

DR. MAKHIJANI: Yeah.

DR. NETON: -- sure what we're doing --

DR. MAKHIJANI: I think so. That's the main point that's made in that finding in 5.7.6 that's referred to. The 5.-- 5.3.6, the other one, is an environmental dose finding, which I think is covered elsewhere and we've said that omitting environmental dose for badged workers is not an issue, shouldn't be taken into account --

DR. NETON: Right.

DR. MAKHIJANI: -- so that -- that's been resolved separately, I think.

MR. PRESLEY: And we -- can we leave this that NIOSH will develop correction factors?

DR. NETON: I think so, and we'll go back and look at pages 43 and 71 of the original review report and make sure that whatever we do is consistent with the comments that are made there.

25/75 SPLIT

MR. PRESLEY: Okay, 11(c) has to do with the 25/75 split, and NIOSH will provide an explanation of the split on a best-estimate basis. Have y'all had a chance to do any work on that yet?

MR. ROLFES: Cheryl, I have this marked as the work has been completed here.

MS. SMITH: Yes, and I -- I can't speak to that. Grif and -- and I know that the 25/75 split is in the TBD and that we do use it, but -- what the explanation has been, but I can follow up and ask Jack if he's -- I don't know that he's in today. He may be actually back in Cincinnati.

MR. PRESLEY: Cheryl, this is Bob Presley. It says that it -- that it's in the Chapter 6 revision.

MS. SMITH: Okay.

MR. PRESLEY: And we should get that when the

revision comes out.

MR. ROLFES: Correct, when NIOSH approves it.

MR. PRESLEY: Right.

MS. SMITH: Right.

MR. PRESLEY: Okay.

MS. MUNN: So it's just awaiting approval.

STATISTICAL METHODS

MR. PRESLEY: Let's go ahead. Okay. All right, (e) -- 11(d), NIOSH will develop statistical methods to --

DR. ROESSLER: Yes, I'd be interested in knowing what that means, that NIOSH will develop statistical methods to determine if practice was widespread.

DR. NETON: Something to do with the workers not wearing their badges --

MS. MUNN: Hiding their badges (unintelligible) --

MR. PRESLEY: Hiding their badges.

DR. NETON: We had talked about this before in the context I think of Rocky Flats and then some of the other sites -- Hanford, I think, there's also an issue. Our thought on this was if we have particularly robust data and data that approached -- many times these workers

were asserting that they were told not to wear their badge after they reached the detect-- reached the exposure limit so they could just continue to keep working and report no dose over the limit. And our thought on that was if we have sufficient data -- this didn't pan out for Rocky Flats and I don't know if it would for NTS, but with sufficient data you could look at the distribution of workers' badges and see if they actually continued to rise towards the limit or started to tail over and flatten off as they got to the limit, which would -- which would be evidence, not conclusive evidence but some evidence that that occurred. If the slope of that cumulative dose over the monitoring period -- over the year continued to rise, then it would not tend to support the theory that the workers were leaving their badges in the rack because they continued to receive incremental dose. But that -- that would work for internal.

MS. MUNN: Well, the continu-- the converse argument would be that that could also be taken as indication that their supervision recognized their approaching of the limits and changed

their work pattern so that they would not continue --

DR. NETON: True, it's not (unintelligible).

MS. MUNN: -- to be exposed, so it -- there -- it's just as indicative in one direction as it is another.

DR. NETON: I'm aware of one case -- as a matter of fact, one of the first cases we ever did at NTS -- where the worker -- worker's badge results stopped increasing, they said he was taken out of the workplace, when in fact he was monitored for tritium and his tritium values were as high as ever over in the next six months, so --

MS. MUNN: Yeah.

DR. NETON: -- that was pretty conclusive evidence in our mind that --

MS. MUNN: Right.

DR. NETON: -- he was still working.

MS. MUNN: Then you have a basis for making your --

DR. NETON: So you know --

MS. MUNN: -- decision.

DR. NETON: -- statistical methods may be a little -- a little too loose, but --

DR. ROESSLER: I understand what it means --
DR. NETON: -- (unintelligible) concept --
DR. ROESSLER: -- now, yeah.
DR. NETON: -- that we're trying to play with. I don't know whether these will come to fruition or not. And then if they don't pan out, you're -- you're in a situation where, you know, how -- how to deal with it. And then you get into this sort of weight-of-the-evidence approach.
MS. MUNN: Well, when you have a bioassay, you really don't --
DR. NETON: (Unintelligible) bioassay.
MS. MUNN: -- wring your hands about it very much.
DR. NETON: Right. All we could do with this analysis was to determine if the practice was or was not potentially widespread.
MS. MUNN: Yeah.
DR. NETON: It still wouldn't preclude the situation where a couple of isolated workers may have done that. In those cases where workers do assert that, though, we would -- you could assume them to be unmonitored at that point and then go to coworker models. That

would be an approach. We've done that, I think.

MR. PRESLEY: Can we highlight this as a complex-wide issue and that no other action would be required by the working group?

MS. MUNN: Yes, that's what we've got.

DR. NETON: Well --

DR. MAKHIJANI: Now Jim, am I to understand that this statistical analysis is being done for NTS?

DR. NETON: I don't know, Arjun, that's -- I'm kind of getting into this a little later, but I think it says that's what we're doing, so --

DR. MAKHIJANI: Yeah, because I remember you were saying this some time back --

DR. NETON: Yeah.

DR. MAKHIJANI: -- or someone saying that would be the approach, and I think it would be very useful to see that.

DR. NETON: Right. And you know, even if we develop this complex-wide -- it's a complex-wide issue, but the approach we take to evaluate this issue is site-specific -- again, as is usual. And we do have to address this for NTS. I mean us coming up with a potential

approach to solve this issue would not work. We'd have to apply it to NTS.

Does anyone on the ORAU side that's on the telephone know if this is being worked on at this moment?

MS. SMITH: This is Cheryl. The coworker doses that were developed that are in that page change that was referred to earlier -- probably this -- this was data that Jack Fix got from Martha, and I think other than going through lots and lots of individual records, it's as good as it's going to get. And I'm not sure that this type of analysis that Arjun is speaking of here would be possible with that data.

DR. NETON: Well, be careful --

MS. SMITH: Now perhaps -- well, you know, Martha could be approached to see if there's some other ways to have -- to -- to retrieve the data so that you -- we could get it in a more specific format.

DR. NETON: Well, we need to go back and look -- I know, for example, that all of the claimant data that we've received from DOE, in general, has been put into workbooks. So presumab--

MS. SMITH: Correct, and --
DR. NETON: -- presum--
MS. SMITH: -- I actually -- when we were trying to figure out how we were going to assign doses prior to 1957, I had one of the data entry people here go through all the cases with -- claimant cases that had data between '51 and '57 and put it into a spreadsheet, and it's not -- it doesn't have any statistic-- statistical validity or it's just not strong enough. I can forward that to you if you'd like.
DR. NETON: I'd like to see that. Let's -- let's -- I guess the answer is that we're working on it here and --
MS. SMITH: Okay.
DR. NETON: -- we will get back to you.
MR. PRESLEY: Okay.
DR. NETON: This is a -- this is a real problem for -- for a number of sites.
MS. MUNN: But it would seem your approach that you outlined makes good sense. If you have bioassay, it's not an issue. If you don't have bioassay and do have data from coworkers, then obviously it would be a logical thing to do.

CORRECTION FACTORS WITH JOB MATRIX

MR. PRESLEY: Okay, 11(e), correction factors have been developed and can be applied in conjunction with job matrix. Chapter 2, we're still waiting on revision six to come out, but I don't see any action on this whatsoever by -- this is -- could probably be marked complete, pending the revision of the -- of Chapter 6.

DR. MAKHIJANI: Mr. Presley, is is -- it is -- there -- there isn't any action on the part of the working group, I guess, until -- until the revision is complete.

MR. PRESLEY: That's correct.

MS. MUNN: Yeah, agreed.

MR. PRESLEY: I agree.

MS. MUNN: Break time.

MR. PRESLEY: All right.

DR. ROESSLER: (Unintelligible) on till after break.

MR. PRESLEY: Why don't we have a break for about 15 minutes and be back in here at five after 11:00. Is that all right with everybody?

DR. ROESSLER: Sounds good.

MS. MUNN: Okay.

(Whereupon, a recess was taken from 10:49 a.m.

to 11:09 a.m.)

DR. WADE: Could I ask those on the line to identify themselves? Who's on the line with us now -- telephone line?

MS. HOMOKI-TITUS: This is Liz Homoki-Titus with Health and Human Services.

DR. WADE: Hi, Liz.

DR. MAKHIJANI: This is Arjun.

DR. WADE: Hi, Arjun. Thank you for coming back. Cold and rainy here in Cincinnati.

MS. SMITH: This is Cheryl.

DR. WADE: Hello.

MS. SMITH: With the ORAU team.

DR. WADE: Good. Is Sandy Schubert on the line with Senator Reid?

MR. MCDONOUGH*: This is Alex McDonough from Senator Harry Reid's office. Sandy has been in and off the call.

DR. WADE: Now we -- we had the matrix sent to Sandy.

MR. MCDONOUGH: Okay. I'll let her know that you said --

DR. WADE: Yeah, so I --

MR. MCDONOUGH: -- that you sent it and ask her to send it to me.

DR. WADE: Okay, if -- if that's easy for you to do.

MR. MCDONOUGH: Yeah, that -- that's easy to do. We're in the same office.

DR. WADE: Okay, good.

MR. MCDONOUGH: Thank you.

DR. WADE: Thank you for joining us.

MR. PRESLEY: Billy Smith, are you there?

MR. SMITH: Yes, I am.

MR. PRESLEY: All right, thank you.

MR. ROLFES: Is Gene Rollins back?

DR. WADE: Is Gene Rollins back with us?

(No responses)

MR. PRESLEY: We want to -- to bypass 12 then?

DR. ROESSLER: Until Gene gets back.

MR. PRESLEY: Till Gene gets back?

DR. ROESSLER: That might be (unintelligible).

MR. ROLFES: That might be a good idea, I think.

MR. PRESLEY: I think it'd be an excellent idea. So need to mark it with bypass 12. We bypassed (unintelligible).

ENVIRONMENTAL VERSUS OCCUPATIONAL EXPOSURE

Okay, 13, environmental dose -- let's see, guidance in the TBD may not be adequate

(unintelligible) exposure. Oh, action on this is revise environmental versus occupational exposure, add guidance to Chapter 5 revision as needed. Mark and Jim, do y'all want to comment on what's been done on that?

MR. ROLFES: Let's see, Cheryl, do you know -- have you spoken with Vern Cath-- or I'm sorry, Ron Catherine* or Vern Shockley* about iodine-131 venting? I don't know what the status of that is, Cheryl.

MS. SMITH: I'm sorry. Ron Catherine has provided some guidance for iodine and it has been incorporated into the revision to the TBD that will be, you know, for OCAS review as soon as it's released or -- I -- I believe it's going to go in -- yeah, it's going to go into Chapter 5.

MS. MUNN: Chapter 5, good.

MR. PRESLEY: So we need to be looking for a -- a document to be coming out from OCAS. Is that correct?

MS. SMITH: Well, it hasn't gone through internal review at this point, so I don't know what the time line is on that. Is there a -- is it part of one of the Gantt charts, Mark, do

you know?

MR. ROLFES: I'm not certain.

MS. SMITH: Okay.

MS. MUNN: But that Chapter 5 revision is essentially done. It's -- again --

MR. ROLFES: Yeah, it -- it sounds like --

MS. MUNN: -- it's just waiting --

MR. ROLFES: -- the work has been completed, we're just awaiting for final review and approval.

MS. MUNN: Right.

DR. BEHLING: Is there concern about other radioiodines besides 131? Arjun?

DR. MAKHIJANI: You know, I -- I cannot remember if we've raised that in -- in our site profile review. Let me look at it. I don't -- I don't remember. These -- these comments get awfully narrow in the matrix and so it's hard to keep track of it without going back. I'll -- you can go on with the discussion. I'll look at it and then --

DR. BEHLING: Yeah, because if it's -- if -- if it's around (unintelligible) fresh fission product inventory that's being vented, going back to my work that I just completed -- as you

know, work for the CDC -- on that issue in the Marshalls, the people's exposure who were close to BRAVO, when you look at the thyroid doses, the iodine 131 for those closest to -- to Test BRAVO were actually only one-sixth of the total thyroid dose from the other iodines -- 132, 3, 4 and 5. So in essence, you may be overlooking a larger dose from shorter-lived radioiodines if you focus on iodine-131, depending on the age of the -- the release.

DR. MAKHIJANI: Yeah, I -- I don't see that we raised the other iodines, at least in this finding. It may be -- are you thinking of what, 135 or --

DR. BEHLING: Well, yeah, they -- they range from -- from, you know, a short -- 20 minutes to 20 hours. But as I said, the yield for some of the other iodines is higher and therefore giving you a differential higher dose. As I said, I'm going now on the work I'm doing for the Marshall Islanders, and some of their exposures on Rongelap -- the total thyroid was actually six times higher from the others than it was for iodine-131 by itself.

DR. MAKHIJANI: Yeah. No, I -- we may not have

raised this. It may have slipped through a crack here.

MS. MUNN: Well, how -- how does --

MS. SMITH: This is Cheryl. Ron's writeup includes most of the short-lived daughters, so it's -- it's not like it is just addressing iodine-131.

DR. BEHLING: Yeah, and --

DR. MAKHIJANI: Oh, great.

DR. BEHLING: -- tellurium comes into play here because you will see iodine decaying -- tellurium decaying into iodine.

MS. MUNN: Now how -- how is this item particularly different than comment one? Because in comment one, you know, where we started from this site was with a list of radionuclides that SC&A felt had not been addressed. And I thought we were going back and pretty much covering the waterfront on everything. The 131 came up as a question of venting, I think, but were these -- were the iodines and the other short-lived isotopes that are of concern in this item not covered in the big, broader issue with Table 1? Do -- do we know, because I don't have the original table

in front of me.

DR. BEHLING: I don't know. In fact, I'm not even familiar with (unintelligible) --

DR. MAKHIJANI: Oh, Ms. Munn --

MS. MUNN: Yeah.

DR. MAKHIJANI: Ms. Munn, this is Arjun. I -- I think that this finding was in the context of environmental dose and workers who may not have been monitored, and how environmental dose from ventings was going to assigned. So it was a rather specific thing rather than a more general discussion of which radionuclides were relevant at the test site as a whole.

MS. MUNN: Okay, so this -- this would be case-dependent then.

DR. MAKHIJANI: Yes.

MS. MUNN: Yeah.

DR. MAKHIJANI: So for unmonitored workers who didn't have the internal monitoring for iodine in cases of venting.

MS. MUNN: Okay. Thank you.

MR. CLAWSON: (Unintelligible)

MR. SMITH: Arjun, this is Billy Smith. I had a question regarding what you mean by unmonitored workers. Are you talking about

workers who did not submit urine samples?

DR. MAKHIJANI: Well, workers who did not submit urine samples or, in the case of iodine, presumably the thyroids were not monitored in case they were in the path of a plume or something like that.

MR. SMITH: So it's -- it's either a direct thyroid counting or were not bioassay sampled --

DR. MAKHIJANI: Yes.

MR. SMITH: -- is your definition of an unmonitored worker in this case.

DR. MAKHIJANI: Yes.

MR. SMITH: Okay.

MR. PRESLEY: Okay, what I put down on that was working group will review when revision to Chapter 5 comes out. Again that's one of these ongoing items. Everybody agree?

DR. MAKHIJANI: I beg your pardon, Mr. Presley?

MR. PRESLEY: Arjun, what I put down was working group will review when revision to Chapter 5 comes out.

DR. MAKHIJANI: Right.

MR. PRESLEY: Okay?

DR. MAKHIJANI: Yes.

NO INTERNAL MONITORING DATA UNTIL LATE ’55 OR ‘56

MR. PRESLEY: All right. Comment 14, there's no internal monitoring data until late '55 or '56. Some plutonium from then on some -- some -- I guess that's "and" -- and some tritium from 1958 plutonium, tritium and mixed fusion products. This has to do with item 5, which Gene is not here. We have not discussed this yet.

MR. ROLLINS: Bob, I'm back on the line now.

MR. PRESLEY: Great.

MS. MUNN: Just in time.

DR. WADE: Thank you, Gene, for joining us.

MR. PRESLEY: Hey, Gene, have you moved in yet?

MR. ROLLINS: I'm now a proud homeowner once again. I'm going to be moving on Friday, thank you. I never saw so many papers to sign in my life.

MR. PRESLEY: Well, thank you for coming back. We appreciate you very much.

Does anybody have any comment on 14, or do we need to, since Gene's here, go back and -- and try to pick up five and -- and 12 before we go on?

DR. ROESSLER: Seems like we should go back to

five, start there.

MR. PRESLEY: Gene --

MS. MUNN: The only thing I would ask is that we kind of take a quick look at the other items that we haven't addressed yet today to see how many of those are incorporated in that Chapter 5 revision so that we don't have to keep going back to it.

MR. PRESLEY: Well, we know 14 is.

MS. MUNN: We know 14 is.

MR. PRESLEY: And let's see --

MS. MUNN: We have -- 18 is. So is 17.

MR. PRESLEY: Right.

MS. MUNN: And there -- I thought there was one other -- no, there are two others, 23 --

MR. PRESLEY: 23 and 24 -- no, 23(b).

MS. MUNN: -- 23(b), yeah.

MR. CLAWSON: This is Chapter 4 -- right? -- or Chapter --

DR. MAKHIJANI: Are we talking about things that relate to comment number five, the resuspension model?

MR. PRESLEY: Right, what -- what we were going to do, Arjun, since Gene's back, is go back and start on five. 'Cause I think by doing that we

may ask -- answer some questions for some of these later issues.

RESUSPENSION MODEL

Five has to do with the resuspension model and resuspension factors, and Gene, are you ready to discuss this with us --

MR. ROLLINS: Yeah, we can start talking about this.

MR. PRESLEY: -- (unintelligible) your finding, sir?

MR. ROLLINS: I've done several things. Number one, Dr. Anspaugh provided me with his perspective on what the problems are associated with, number one, my model -- my resuspension model. And he also provided some information about some of the items we should consider in doing dose reconstruction regarding resuspended contaminated material. Has the Board had an opportunity to read this paper?

MS. MUNN: I have not.

MR. PRESLEY: Me either.

DR. MAKHIJANI: Ms. Munn, it was sent -- it was sent out somewhere in the first part of October. It's dated October 8, 2006.

DR. ROESSLER: I've read it, and I see I have

lots of little tabs on it, but I haven't revisited it so I think I'd have to do some studying.

MR. PRESLEY: Oh, I have read that, too.

DR. ROESSLER: Maybe you can point out pertinent things in it.

MS. MUNN: Okay.

MR. PRESLEY: Yeah, I've probably got it on here.

MS. MUNN: How would I have filed that?

DR. ROESSLER: One of the notes I have is -- it says need -- we need to have NIOSH and SC&A, along with Lynn Anspaugh's input, do some give-and-take at a workgroup meeting. Maybe this is it.

DR. MAKHIJANI: Yeah. Dr. Anspaugh I think is in Tahiti, but --

DR. ROESSLER: We could all go there with --

MR. ROLLINS: Yeah, I wish I was with him.

DR. MAKHIJANI: He said he was having a good time.

MS. MUNN: Maybe we should all go over and discuss this with him.

MR. ROLLINS: I could speak in some general terms about some of the items that he has

brought up. And first of all, I would preface all my remarks by saying that I don't disagree with -- with any of the technical issues that -- that Dr. Anspaugh has -- has brought up. These are -- these are things that we have all thought about, but we have also tried to -- to work towards a workable solution. And my -- my original attempt was to try to come up with a method that would provide something that we could hopefully agree on would be a reasonable overestimate or a reasonable underestimate, depending on how we intended to use the -- the material.

One thing I did do was go back and develop a mass loading model based on full* contamination data and mass loading factors that we -- that are available for the Nevada Test Site. What -- what my simplified -- and I will call it a simplified mass loading model -- did not take credit currently for any decay of short-lived radionuclides, which was one of the major concerns that Dr. Anspaugh voiced in his paper.

MS. MUNN: Uh-huh.

MR. ROLLINS: That can be done.

DR. ROESSLER: Yeah.

MR. ROLLINS: It becomes somewhat more difficult when you consider that there were multiple episodes that each one would have to be handled as far as decay correction differently and you can -- you can begin to see how complicated it could be. But I think there are some things we can do to simplify these calculations by doing some bounding calculations.

He has provided a list of radionuclides which he says are important 21 hours after a detonation. And one thing that I -- that I could do that would not take an unreasonable amount of time would be to go through these radionuclides, compare them with their relative abundance and their importance to dose -- taking those two factors together, I could -- I could screen these to see where the potential dose is coming from. And I think, hopefully, we could all agree that if I can demonstrate that we're capturing 90 or 95 percent of the radionuclides that contribute significantly to dose, then maybe a lot of these would drop out and the problem would become a little more tractable. I think I could do that in a

reasonable amount of time. Because a lot of these radionuclides are short-lived, I don't think their contribution to dose is going to be of much significance. But we need -- as he pointed out in his paper, we need to show that to be the case.

Back to my mass loading model, you may remember in a previous discussion that we had I had average and maximum intakes based on my resuspension model currently in the TBD. The average intakes were kind of small and really of no dose significance. I think my original proposal was well, we can use those in a case where an individual is clearly compensable 'cause it won't make any difference. The maximum intakes, on the other hand, that I originally provided from my resuspension model are a couple of orders of magnitude higher than the average, and I felt like that that would provide a reasonable overestimate.

Well, in going back and applying a site-specific mass loading model, what I've learned is that my original maximum intakes in becquerels per year would actually increase by a factor of ten over what I had previously had

as a maximum intake. Now that's with no decay correction, but I think what we can do, because the relative dose is fairly small -- in fact it's very small, because -- and I think -- I don't -- I don't remember whether I gave you -- it seems to me that I provided these numbers for you in a previous --

MR. ROLFES: Gene, that's correct. This is Mark Rolfes. I do have -- I believe for the August 8th call -- I take that back. Back in July you did provide some dose tables illustrating the maximum intake in associated doses to various organs, and then the factor of ten higher as well.

MR. ROLLINS: Yes. In fact the example that I used to illustrate this was my assumption was that an individual had ten years of the maximum intake values provided in the table, and the doses that I provided in the table were actually 30-year integrated doses. And I also provided a table that showed what would happen if you increased these doses by a factor of ten, which is -- which would, by -- I guess by accident, look very much like my current mass loading propos-- loading model proposal. And

what it shows is that, with the exception of the respiratory tract organs and the case of the liver for uranium and bone surfaces for plutonium, the consequences to other organs in the body is very small. We're talking several millirem to maybe as much as 300 millirem. That's for ten years of exposure.

So that helps to -- helps you, hopefully, to get an idea of the magnitude of the problem and what potential effect that it would have on a probability of causation, for example.

Now in the case of lung, for example, if you used my current proposed, simplified mass loading model -- which would give us ten times the intakes that were previously published in the TBD as maximum intakes -- ten years of exposure at a 30-year dose to the lung would work out to nine and a half rem. Now from my experience in using IREP and determining probability of causation, for an individual with a reasonable amount of latency period -- which is typically ten to 15 years -- and for a previous smoker, which in my experience, 99 percent of the Energy employees were previous -- former smokers, it takes about 60 to 65 rem

to exceed 50 percent probability of causation. So another nine rem from resuspension could be important to determining compensability.

Doses to the ET-2 region and the LNET regions are even higher than that. They would run about 20 -- 16 and 20 rem, respectively. But some of those cancers associated need much more dose than that to go compensable.

So I guess I've kind of, in a way, outlined where we are as to the importance or potential importance of resuspension. And now I -- now I'm really at a loss as to where we should go from here, how much resource should be expended because, you know, this is a problem that if you -- we can't know all the variables. We can't know where a person was. We can't know what the atmospheric conditions were at the time that the individual was there. There's a lot of uncertainty in this. But as I pointed out, there are a few cancers that could be affected if we become too claimant-favorable. And so I can open this up to discussions and maybe we can get some ideas of what a reasonable path forward would be for this problem.

DR. ROESSLER: Well, Gene, I think the comment that's shown in the matrix about the working group expressing concern about how significant the impact was to go through all of this was mine, because I remember that table -- I don't have it in front of me now, but there were huge negative exponents in some of the doses, and you've just verified that for most of the organs it's on the order or maybe millirem and -- at a maximum calculation. So my -- my concern at that time was that a great deal of resources and money be expended on this, when there'd probably be more important things to be working on. But you now brought up this dose to the lung as a potential one that could be important, so I -- right now I'm not sure, either, where we should recommend you go on it.

MR. ROLLINS: Well, I can throw out some ideas, and maybe we can discuss the acceptability of some of these ideas. For example, at Hanford we have situations where we had construction workers that were not monitored, so we developed a coworker study that would allow us to assign intakes of various radionuclides, based on those people that were monitored --

based on that experience. And then we said, because of some uncertainty, we can -- we can double that, and we're currently doing that at Hanford. There were, I suspect -- and maybe Billy could comment on this, but there were probably a fair number of people who were -- had a potential for being exposed, but were not on a bioassay monitoring program. And of course this whole premise of this environmental -- occupational environmental chapter is that there were people out there walking around being exposed that nobody ever really gave it much thought. But maybe Billy did give it a lot of thought, I don't know. Maybe Billy has some thoughts on this that could help move this discussion forward.

MR. SMITH: Well, Gene, let me make a comment here. Of course all of you have been to the test site and know the size of the area that we're talking about. And of course you know everybody was monitored with external dosimeters. We only did internal monitoring, either bioassay sampling or whole body counting, on a select subset of people, primarily the radiation safety personnel.

Hence the RCTs, radiation monitors, health physicists, industrial hygienists who worked in radiological areas.

We also chose another subset of people that we monitored, which were the WSI guards, those had permanently-assigned stations, and also the rolling guards because they were all over the test site all of the time. And based on the kinds of data that we got from doing the bioassay sampling and whole body counting of these individuals, then you could probably come up with some -- some -- use these as a study to do a coworker model for those people who were not sampled and not whole body counted.

But I can tell you right now that the number of positive doses or exposures that you would get from people that -- from the two subsets that we sampled were extremely, extremely small.

And the other thing that we had that nobody's seemed to mention today is that we had a 24/7 environmental surveillance program where we air sampled the air over the entire test site. We had several hundred environmental air samples that were running 24 hours a day, and those were analyzed on a quarterly -- monthly and

quarterly basis using very large volumes of air, and we were able to measure what the plutonium concentrations were and the fission product concentrations were in the environmental air. And these concentrations, again, were extremely low. All this is documented in the NTS environmental reports that are published.

MR. ROLLINS: This is Gene Rollins. Billy, thank you for that. Also included in the TBD Chapter 4 is a summary of the atmospheric monitoring data. And as you said, Billy, even using maximum values based on actual empirical data that these monitors provided, it does not support these maximum intake values that I -- that I have proposed. In fact I said that in the TBD, that we need to be careful because the actual empirical data does not support this model data, and I gave reasons for that, mostly just claimant-favorable assumptions in the development of the model.

Now one of the concerns of Dr. Anspaugh is that these averaging values that we get from these monitors may not be reflective of what an individual could have been exposed to had he

been in the wrong place at the wrong time, for example. But now that's the very example of a situation that we -- we could probably never know whether this individual was in the wrong place at the wrong time. And if we make the assumption that everybody was in the wrong place at the wrong time, then I think we may be going a little bit too far in the claimant favorability arena.

MS. MUNN: This gets outside of being claimant favorable and gets into reputation of known data, of good science and certainly of any epidemiological study that could support any such thing -- which of course we're not allowed to utilize. But nevertheless, it's of real concern to a few of us on the Board that we not get outside the arena of good science or of available data. So this appears to be a little bit like some of the programs that have been put together to try to incorporate all the variables to compute global warming. We're just -- we have to be really reasonable and be cautious, I think. The effort that you folks put into it is admirable, because it appears to some of us that it's a real effort to be as

specific as possible. That's genuinely appreciated.

Conversely, if the effort is going to lead us to consequences that are very small, then some of us have a real need to question that. So thank you for what you're doing, but your -- your concerns over claimant favorability falling past the point of reason and into over-concern is very well-taken here.

MR. ROLLINS: This is Gene Rollins again. Moving -- beginning to talk again about the potential for a coworker study, what Billy says has certainly been my experience, is that there are very few positive bioassays at the Nevada Test Site. So if we were to develop a coworker study and try to assign dose, then my suspicion is it's going to be driven largely by less than MDA values.

Now for the fission products, that does not result in any significant dose. However, for plutonium and uranium, and for a select few radionuclides, assigning missed dose does result in some significant organ dose. But that's one way we could do that, and we might be able to make some justification for reducing

those numbers. But that's one approach that we could use. We've used that at other sites, and so there is precedent for it.

MS. MUNN: Precedents are always one of the things that are of concern, I think, especially when the circumstances vary so widely from one site to another. So making a decision to, in all cases, assume that there are large missed doses for the claimants may fall outside the realm of reason. It would be difficult to justify that, I think. In a truly scientific, peer-reviewed program it would be, I believe, difficult to justify making that assumption with a broad brush.

DR. MAKHIJANI: This is Arjun. Gene, why -- why are you not using the T* to the minus 1.2 reduction to decay the -- first you correct and go back using the X tables, but then -- you can use a correction for decay so you don't come up with numbers that don't have -- you know, that don't -- that don't have sort of physical reasonableness.

MR. ROLLINS: Could you excuse me for just one second? I'll be right back with you.

DR. ROESSLER: What's he talking about, Hans?

Is that a --

DR. BEHLING: No, the -- Arjun the Hicks table -- for instance, if you're looking for a time 20 hours past the detonation, the Hicks tables give you exact citation of both activation and fission products.

DR. MAKHIJANI: Yeah, I realize that, Hans, but what I'm saying at that point if you can calculate a gamma dose, why can't you then use a T to the minus 1.2 to correct that as time goes on?

DR. BEHLING: Well, in fact --

DR. MAKHIJANI: But this is resuspension. I'm sorry. Yeah, okay.

DR. BEHLING: No, the Hicks tables actually give it to you in terms of MR per hour, and then you can determine, based on time interval -- you can scale -- as you and I talked yesterday, I'll show you how to use the Hicks table.

MR. ROLLINS: As I said -- this is Gene Rollins again. As I said, there are methods that we can decay-correct, but it becomes very complex if you try to decay-correct for the multiple events. The reason -- the approach that I took

was based on the data that was available. As Billy said, when the environmental reports started in the late '60s and early '70s, there was a plethora of air sampling data. I could find nothing of any use prior to that. Prior to that they were mostly interested in what the conditions were actually in the plume, which is not the conditions that people were exposed to, so it was very difficult to try to move back in time.

I still believe, based on what I believe a screening analysis will tell me, is that the short-lived isotopes I do not believe are going to be large contributors to organ dose compared to the other -- cesiums, the strontiums, the uraniums and the plutoniums. Plutonium data of course, because of security reasons, a lot of that data was not available. You won't find that sort of thing in the Harry Hicks reports. Dr. Anspaugh does provide a recommendation about how to get there by using ratios of cesium. Again, additional complexity, many variables to consider over time. It's just a matter of where are we going to expend resources.

MR. PRESLEY: How many cases are we talking about here -- this would -- get into?
MR. ROLFES: There's approximately what -- the total number of claims that we have for Nevada Test Site I believe is around 1,300 claims.
MS. MUNN: Uh-huh, and we've probably processed a number.
MR. ROLFES: Yes, so I would have the number available right now. Maybe -- is there anyone available to check to see the number of claims that we have completed in NOCTS? Is there anyone on the line that might have access to NOCTS?
MR. SUNDIN: Mark, this is Dave Sundin. If you'll give me a minute I think I can get that for you.
MR. ROLFES: Great, thank you, Dave.
DR. ROESSLER: While he's doing that, I'd like to address a question to Arjun. In view of the discussion, the things that Gene has said about the importance of -- or the impact of this on the doses and also Billy's comments about the whole body counting and the atmospheric monitorings, do you think many people would have slipped through the cracks? Have you

changed maybe your impression on this, that this maybe is not deserving of a great effort?

DR. MAKHIJANI: I don't -- I don't know how to answer that because I don't know how the claims fall out. I think from -- take from what Gene was just saying, I think maybe it might be more relevant to the pre-1970 years than the post-1970 years. But I'm not sure. I'm not sure.

DR. NETON: This is Jim Neton. It seems like there's no really (unintelligible) that the working group can come up with as far as direction on this, and I -- Gene has proposed a couple of alternatives. And I would suggest that we, NIOSH, need to go back and deliberate this among ourselves and pick a path forward and then throw out the reasons why, you know, we chose to do that and bring it back. I think Gene's bounding analysis without decay correction has merit. I think we need to discuss how much extra work there would be to decay-correct these values to get a more reasonable number, and is that effort worth it. And if not, then it may be that that's our best estimate and we'll have to live with it. But I think this -- maybe the ball is in our court

here now to come up with a recommendation to the Board -- the working group.

MS. MUNN: I would also like to see this investigation limited to the radionuclides that one would reasonably expect to be significant contributors. There seems to be no legitimate reason for including minuscule contributions which, added all together and taken in a lump, are not going to make significant changes to a POC in any case. And if we could just simply get past the concept of trying to account for every single radionuclide that could have been even a minor contributor -- if we could even get past that point it would seem to me that you would have a better way to proceed. I don't know how the other Board members feel about that, but it would just seem wise to me that the first step would be to eliminate apparently insignificant contributors and focus on only what you can -- what we all know are the real problems.

MR. ROLLINS: This is Gene Rollins again. Dr. Anspaugh did provide in his paper, Table 3, a list of 38 radionuclides that in his expert opinion -- has all the ones of, as he puts it,

relatively greater prominence at 21 hours after the SEDAN event.

MS. MUNN: I see that, and those seem to be -- that seems to be a pretty thorough listing, to me. As a matter of fact, even that seems to be extensive.

MR. ROLLINS: Well, I would like to point out that of the 38 listed there only 14 are currently in our version of IMBA, so we could not even generate annual doses for many of these using our approved methods. However, having said that, many of these are so -- short half-life that effectively all of the dose administered would be in the first year of the intake anyway, so that's not an intractable problem. I think doing a screening analysis on these 38 would be of interest, and that would be simply looking at the relative abundance at 21 hours and comparing that to the various dose conversion factors -- organ dose conversion factors, and then we can figure out which of these 38 contribute the majority of a dose.

MS. MUNN: That seems eminently reasonable to me, especially in view of the fact that I see that this table even includes a number of the

other iodine isotopes that we were discussing earlier in another context. Even those are there. So I'd really like to narrow this down to where it becomes a workable thing for NIOSH, and have us all agree that this is not going to throw people way underneath any reasonable POC that they would otherwise have had.

MR. ROLLINS: There is one -- this is Gene Rollins again. There is one serious problem, as I see it, with this list. And that is some of the really bad actors are not here, and that is for security reasons.

MS. MUNN: Uh-huh.

MR. ROLLINS: (Unintelligible) 239, 238, uranium-234, 238, those -- those radionuclides are not in this list, and that was not by accident. That was by design. And so to do any comparative analysis to determine which of these radionuclides provide most of the dose, we have to include those, and somehow we have to get a handle around them without violating classification issues.

MS. MUNN: Yes, I can see that. And how to approach that I see as a larger issue than choosing which of the nuclides on the table are

the greatest considerations. Is there -- perhaps this is one of those cases where atmospheric data might be of value.

MR. SMITH: This is Billy Smith. I believe so. We -- the environmental reports do contain concentrations of what the plutonium concentrations were at the various sampling locations on site, and you may be able to correlate that data to the other fission products like strontium and cesium that are in Dr. Anspaugh's report.

MS. MUNN: That's a possibility, that it seems much more reasonable to begin to approach it from that direction.

MR. ROLLINS: This is Gene Rollins again. That was -- Dr. Anspaugh did mention that there -- there may be a way, by ratioing --

MR. SMITH: Yep.

MR. ROLLINS: -- the more recent data ratios of cesium to plutonium than -- that way we may be able to go back and infer something about what the relative abundance of plutonium would be to these other radionuclides that he's listed in Table 3. However, now -- if we get it right, now we have generated a classification problem,

and that information would not get through derivative classifiers.

MS. MUNN: So we have a catch-22 here.

MR. ROLLINS: Do you think I'm incorrect on that one, Billy?

MR. SMITH: Well, you know, we cleaned up Enewetak and we made gamma measurements on Enewetak with the IMPs, the planar germanium detectors, by looking at primarily cesium and americium photons in the soil there, and we were able to infer what the plutonium concentrations were because chemical analysis for plutonium was just too expensive. It seems to me that if you looked at the model that was used at -- for the Enewetak Atoll cleanup and -- I don't know whether any of you have read that report, but it's a -- it would take you two years to read it, it's so big, but anyway, there --

DR. BEHLING: I read it.

MR. SMITH: -- there is a good model in there.

MS. MUNN: Hans has read it.

MR. SMITH: Okay. There's a good model in there that would allow you to infer what the plutonium concentrations could be. And I think

that's -- to me, that's what you're trying to come up with with a model is what is a reasonable concentration for the, if you will, classified isotopes -- and I don't mean the classified plutonium is a classified (unintelligible) per se, but you could come up with some numbers for plutonium -- if ingested, what would the dose consequences from those be.

MR. ROLLINS: Okay, this is Gene Rollins again. Dr. Anspaugh took me to task over a statement that I made that -- rightly so -- that most of the contamination out there was from above-ground tests. He says that's not the case. He said -- he makes the case that most of it was from venting --

MS. MUNN: Your ground vents, yeah.

MR. ROLLINS: -- and like the PLOWSHARE, and I don't -- I don't disagree with that because what I've been told is that --

MR. SMITH: Gene --

MR. ROLLINS: -- for the atmospheric tests --

MR. SMITH: Gene, I disagree with it. I don't -- I don't believe -- Lynn Anspaugh and I worked a lot together. I processed a lot of his samples through my laboratory there in

Mercury, and I disagree that most of the contamination that's on the ground there is due to underground testing. No.

Most of the -- particularly the heavy stuff, the plutonium and uranium, would have been laid down as a result of atmospheric testing and from some of the PLOWSHARE shots, but there were not that many of those. SEDAN was one, BUGGY was another one -- I can't think of the names of some of the other PLOWSHARE shots.

But the plutonium areas -- there was an area out there we called Plutonium Valley and -- which is fenced and the access to those areas are controlled. You have to get permission from DOE Operations to enter and you have to sign an entry log, and you come out and you sign an exit log which gives you a stay-time for the people that are in there. You're not allowed to get off the road while you're in those areas. The RCTs are very, very aware of the potential that exists in working in those areas and they apply, you know, their everyday rules to make sure that people are not contaminated and don't get exposed or get an intake.

I can tell you also that as of today they do not go into those areas without knowing that there's a -- there is contamination there. They're required to read the postings and wear appropriate PPE while they're in those particular areas.

So I don't know what Lynn took you to task over about where this contamination comes from, but in a venting -- one of the great things about a venting is that the -- the fission product gases or the gases -- the stuff that's coming out of the ground goes through several hundred feet of soil and stemming materials before it reaches the surface. Most of the stuff that gets out is not plutonium or uranium.

MS. MUNN: Uh-huh, yeah.

MR. SMITH: Because it's scrubbed by all the material that's above it before it gets out. So you've got the uraniums -- I'm sorry, the iodines that comes out and the xenons that come out, rhodium, ruthenium, all of those types of things and -- and some europiums.

DR. MAKHIJANI: But I -- I have Dr. Anspaugh's paper right in front of me. I think he said something a little bit more precise, is that

the -- the maximum values of contamination were in Area 30, associated with the Test BUGGY. And then the next higher values of contamination are associated with Area 20, which was the scene of cratering experiments. So I think he -- he said something rather more precise than what we're attributing to his paper.

MR. ROLLINS: This is Gene Rollins again. I think what I'm hearing is that NIOSH will take an action to develop a model that we will bring back to the Board, with justification for why we believe it is adequate. I think we could -- we could debate this the rest of the day.

DR. NETON: Right. I think this discussion's been helpful, though.

MR. ROLLINS: It has been, but I think -- it's been helpful in identifying how we may move forward on developing a model.

DR. NETON: Exactly.

MR. ROLLINS: And I think we've got an action now to go out and do that and provide the Board with justification as to why we believe it is appropriate and adequate for dose reconstruction.

DR. NETON: Right.
MR. PRESLEY: Okay, this is Bob Presley and I've got it down that NIOSH will look at the problem and come up with a recommendation to the Board.
That concludes five, and we -- let's see, what else did we bypass, did we bypass 12? Is that what it was?
DR. NETON: And six and seven.
MR. PRESLEY: Six and seven?
DR. MAKHIJANI: Six goes with five, Mr. Presley.
MR. PRESLEY: Right, right.
DR. MAKHIJANI: I think the next one is 12.
MR. PRESLEY: That's what I was thinking. Do we want to break? It's five after 12:00. A lot of us have been up since 4:00 o'clock this morning. Do we want to bypa-- or break right now at 12:00 and -- what's a reasonable time for lunch, 45 minutes or an hour?
DR. WADE: Yeah, I think aim at -- aim at ten of and we'll start at 1:00.
MR. PRESLEY: Is that all right with everybody, ten of? Be back in here and we'll try to knock this out by 3:00 o'clock.

DR. MAKHIJANI: Mr. Presley, might I be excused after because I have to go to the hearing.

MR. PRESLEY: Only if you tell us what went on at the hearing.

DR. MAKHIJANI: I will make notes if you like and -- and I will -- I will tell you what went on. I'll send you all an e-mail. How about that?

MR. PRESLEY: Thank you, Arjun.

DR. MAKHIJANI: Okay. I'll be happy to be your rapporteur.

MS. MUNN: I'd like to know if those folks ever get any information at all about how much really has been done. That'd be nice.

MR. ROLFES: This is Mark --

DR. MAKHIJANI: Yeah, well, I'm not testifying, so --

MS. MUNN: Yes, I know you're not.

DR. WADE: I told them that. So we're going to break here -- we're going to break the phone line and we're going to dial back in at ostensibly ten minutes of 1:00.

MR. ROLFES: I did want to check with the ORAU -- the ORAU team members to make sure that they are available for this afternoon following our

break.

MR. ROLLINS: This is Gene Rollins. I'll be back on the line.

MR. ROLFES: Okay.

DR. MAKHIJANI: Hans, can you give me a buzz, please, at home?

DR. BEHLING: Okay, what's your number there? I don't have my telephone --

DR. MAKHIJANI: 301-365-6723. Did you get that?

DR. BEHLING: Yes.

DR. WADE: Okay, we're going to break contact now.

DR. MAKHIJANI: Thank you.

DR. WADE: Thank you all.

(Whereupon, a recess was taken from 12:05 p.m. to 1:00 p.m.)

DR. WADE: Again I would ask, just for the record, are there any Board members on the line? Any Board members joining us by telephone?

(No responses)

Okay, so we don't have a quorum. We can proceed.

I'm sure those of you out there will identify

yourself as the discussion goes on, unless someone is very anxious to have themself identified as being on the line.

(No responses)

RADON DOSE IN THE G TUNNEL

MR. PRESLEY: Okay, we're getting ready to start back again. This is Bob Presley with comment 12, has to do with radon dose in the G tunnel, and it says that they're not favorable to the Gravel Gertie -- not favorable Grav-- not -- claimant -- not claimant-favorable, and then it talks about Gravel Gertie and radon doses.

Gene, do you want to talk about this?

MR. ROLLINS: Yes. I can tell you that I will accept the 0.16 working level for G tunnel. I've already prepared a revision to go into the TBD that will reflect that. I have also received information on the Gravel Gerties from NIOSH and I am evaluating that and, as appropriate, I will include instructions to the dose reconstructors about how to account for radon in Gravel Gerties.

MS. MUNN: Good.

MR. PRESLEY: Tell me a question. I thought

I'd been everywhere on that test site. Where is there any Gravel Gerties?

MR. ROLLINS: I think Billy could probably answer that question better than I.

MR. SMITH: Well, they were -- I think it's Area 6, just south of (unintelligible) to the west of the Mercury highway, over in the area where the new DAF is located.

MR. PRESLEY: Oh, okay. These were -- were used in experiments in early, early days. Right?

MR. SMITH: I'm not sure what they were used for other than for weapons storage and weapons work.

MR. PRESLEY: Okay, yeah. Right.

MR. ROLFES: The Nevada Test Site did approve the design of the Gravel Gerties.

MR. PRESLEY: Right, right, yeah, okay.

MR. ROLFES: They did test it, so --

MR. PRESLEY: That's what it was there, yeah. We actually didn't build any of them, though. Okay, I'm -- I thank you.

MS. MUNN: So did I understand you correctly, Mark, they were designing the Gravel Gerties.

MR. ROLFES: They were testing it to make sure

it would hold up to a blast and confine radioactive material, so --

MS. MUNN: Yeah, okay. So in effect there was not a great deal of work that went on there. They designed them, tested them once or twice and went away.

MR. ROLFES: Correct.

MS. MUNN: So we're not talking about an issue here that would involve either any appreciable part of the site or any appreciable number of individuals --

MR. ROLFES: Correct.

MS. MUNN: -- ever. Okay.

MR. ROLFES: That's right.

MR. PRESLEY: Right.

MS. MUNN: Thank you.

MR. PRESLEY: Thank you very much. What about 12(b)?

MR. ROLLINS: I'm not really sure why that one's not shaded, either, Bob, because I have agreed to implement the .16 working level --

MR. PRESLEY: Okay.

MR. ROLLINS: -- prior to 1985.

MR. PRESLEY: Okay. Can we deem these no further action by the Board -- by the working

group, I mean?

MS. MUNN: Just a follow-up to see if it goes in the revision.

MR. PRESLEY: Right. Okay, let's see, 12(c), what about it?

MR. ROLLINS: I'm not really sure how that's different from (a), but --

MR. PRESLEY: That's fine. It's all the same thing.

MS. MUNN: Just the comment about Pantex, I guess. Are we -- is that a -- is that a necessary thing, to review the -- well, no, (unintelligible) --

DR. ROESSLER: I think that --

MS. MUNN: -- do it.

DR. ROESSLER: I think that, because Pantex has data, they're going to compare the soil type to Pantex to see if that data is appropriate for use at NTS. It sounds good to me.

DR. NETON: Am I to take it that we actually have no Gravel Gertie monitoring data at NTS?

MR. ROLFES: Not that I've located. I haven't looked specifically for it, but I don't know -- Gene, do you -- have you seen any specific air monitoring data for radon within the Gravel

Gerties at Nevada Test Site?

MR. ROLLINS: No, I have not. Billy might be able to --

MR. SMITH: I don't recall that we took any.

MS. MUNN: Well, small program, small number of people.

MR. PRESLEY: Right.

MS. MUNN: Small claimant base.

MR. ROLFES: Based on EPA maps of radon areas and such, the soil type at the Nevada Test Site would be similar to that in Amarillo, Texas --

MS. MUNN: Yeah.

MR. ROLFES: -- and they're within the same range.

DR. NETON: I was going to say 'cause we -- we attempted to use those Gravel Gertie data from Pantex at Iowa and we were not very successful in doing that.

DR. ROESSLER: They're very different and (unintelligible) get a space on the EPA radon monitoring soil type thing.

MR. ROLFES: Iowa was much higher.

DR. ROESSLER: This sounds appropriate.

MR. PRESLEY: Okay, we finished up with 13 and we're down to 14, which again has to do with

internal monitoring and again has to do with comment five. Mark or Jim, what do we plan on -- you know, with resolution five being done, I don't think we have an action here.

DR. NETON: I'd agree with that.

MR. PRESLEY: Does everybody agree?

MS. MUNN: It appears to be covered by our discussions in five.

DR. NETON: Yeah, we're talking about using the Hicks data and mass loading model.

MS. MUNN: Correct.

DR. WADE: So how are you going to word that?

MR. PRESLEY: No action by working group right now.

Now again, that's another thing --

MS. MUNN: Pending.

MR. PRESLEY: -- (unintelligible) we're talking about, pending that --

MS. MUNN: Revision of Chapter 5.

MR. PRESLEY: -- revision of Chapter 5. But I don't want to come back and revisit this the next time we meet if Chapter 5 is not out.

MS. MUNN: Yeah.

DR. NETON: Good point.

MR. PRESLEY: Okay, 15, action, none. Has

anybody got any comments other than that? We've -- resuspension of radionuclides (unintelligible)? We've talked about that in the past.

MS. MUNN: No, it's been agreed to.

MR. PRESLEY: Okay, 16, same thing, it has been agreed to.

MS. MUNN: We're done with that one.

INGESTION DOSES

MR. PRESLEY: Now, 17, ingestion doses.

MS. MUNN: More in the revision of 5.

MR. PRESLEY: Right.

DR. ROESSLER: And it says there's agreement --

MR. PRESLEY: We also have an action on that that when the model is approved and guidance to the Chapter 4 revision.

MS. MUNN: Uh-huh.

MR. PRESLEY: Jim, have you got anything on that other than -- than when Chapter 5 comes out, look at it?

DR. NETON: Well, I'm looking at this ingestion dose thing here real quickly, though. I'm -- ingestion doses -- talks about the EPA model at 5 milligrams per cubic meter.

MR. ROLLINS: This is Gene Rollins. This was -

- and you see in the response there where we were talking about the relative importance of ingestion versus inhalation, and this would be related not to large particles but to respirable particles.

DR. NETON: Uh-huh.

MR. ROLLINS: I provided some background information here using some EPA-accepted factors, and I think -- what I tried to demonstrate was that the inhalation potential dose far exceeds that that you would expect from ingestion.

MS. MUNN: That makes sense.

MR. ROLLINS: Therefore --

DR. NETON: But Gene, does the environmental model have any ingestion dose pathway at all?

MR. ROLLINS: No.

DR. NETON: No. This has been one of the problems we've had with many sites. Well, it started with Bethlehem Steel, but you know, it's recognized by most health physicists that ingestion is a minor -- a minor route of intake. But in some way it needs to be addressed, even if it's just to dismiss it and say that it's pretty small for what reason. It

sounds like you've attempted to do that here in your response.

MS. MUNN: I think all -- my interpretation is that what's really needed is words with that type of guidance going into the Chapter 4 revision. That's my interpretation. Is that incorrect?

MR. ROLLINS: This is Gene Rollins. Would that be satisfactory, that I could put a justification for not considering --

DR. NETON: Yeah, I think so.

MR. ROLLINS: -- ingestion?

DR. NETON: I think if you can build that case and put it in there and then -- you know, 'cause it's conspicuous by its absence.

MR. ROLLINS: Okay, I can do that.

DR. NETON: To many people it's intuitive. You look at it and you've got ingestion pathway, inhalation pathway and you need to address it some way.

DR. ROESSLER: Give some relative numbers to support it.

MR. ROLLINS: Right. Now this is just for the fine particles that the -- the large particle ingestion, that's another issue.

DR. NETON: Uh-huh.
MS. MUNN: Yes.
DR. NETON: Right.
MS. MUNN: Is that reasonable, Hans? Is that a way to go?
DR. BEHLING: Yeah, I guess you wouldn't expect people to be eating their lunch out there or having deposition directly on their foods as they're being consumed, so I would assume that ingestion is a relatively minor pathway in comparison to inhalation.
MS. MUNN: Yeah.
DR. NETON: I was going to suggest as one of the overarching issues we are addressing the ingestion pathway, but of course our main focus is more for the manufacturing facilities, like uranium operations. I'm not sure how directly this would be applicable to NT-- our analysis would be applicable to NTS, but --
MS. MUNN: I'm not sure, either, but I feel relatively sure that any time we find ourselves faced with even a potential resuspension problem that this same issue is going to arise again.
DR. NETON: Yeah. Well, we had had many

discussions with SC&A about the relative magnitude of the ingestion pathway, and we've been at odds. We've always maintained that it's much smaller than what the EPA models that are out there would predict for like home environments and such. And we'd be prepared in -- I think January time frame that's also wrapping up with -- EG&G is doing that analysis for us, as well.

MS. MUNN: Good.

DR. ROESSLER: In home environments don't they talk about children eating dirt (unintelligible) --

DR. NETON: Yeah --

DR. BEHLING: (Unintelligible) --

DR. ROESSLER: I can't imagine adult --

DR. BEHLING: -- home -- home gardener (unintelligible).

DR. ROESSLER: Yeah.

DR. NETON: Some of this EPA study is interesting, but if you look at some of the EPA studies that estimated ingestion per day, they were relying on fecal samples. And they completely disallowed any amount of the inhaled material that was subsequently swallowed as

part of the fecal bolus that's coming out. And so in our opinion they've potentially overestimated significantly the amount that's just ingested from pure contact of hand to mouth type situation, and we're looking at that very closely. I hope to find some data -- we've just found some more recent data on simultaneous measurements of fecal in ura-- in urine for uranium workers. That would give us some handle on what's coming out with the various pathways. If you knew what the inhalation was, you could sort of infer the ingestion.

MS. MUNN: It would really be helpful if by the January meeting you could work that out with --

DR. NETON: We hope to.

MS. MUNN: -- SC&A and get --

DR. NETON: That's why the final resolutions of the Bethlehem Steel -- the Bethlehem Steel profile has been done. We reissued it, but we all agreed that was an overarching issue and we would address that on the side, and that's one of the issues that (unintelligible) --

MS. MUNN: Right.

DR. NETON: -- comes up.

MR. PRESLEY: It'd be interesting to see.
MS. MUNN: Yes.
DR. NETON: We do a lot of interesting work behind the scenes.
MS. MUNN: It's really helpful to get that put to bed.
MR. PRESLEY: Okay, 18.
MS. MUNN: Now on to more Chapter 5 stuff.
DR. ROESSLER: It says no further action, and SC&A agrees with NIOSH's response.
MS. MUNN: Then --
MR. PRESLEY: Anybody have any problems with that? No action.
MS. MUNN: And then (unintelligible) is done. Right? Evaluation is complete. Discussion included in the revision. We're done.
DR. BEHLING: Did this take into account some of the recent work that was published by -- well, I guess (unintelligible) for DTRA -- what's the names? It was just recent article on this (unintelligible).
DR. NETON: Yeah.
DR. BEHLING: God, I worked with him out in the Marshalls. He works for the CIC*. But he came up with some relationship between --

DR. NETON: Right.
DR. BEHLING: -- beta and gamma doses, and they can be as high as 100 to one, and I'm not sure whether or not that was --
DR. NETON: I doubt that that was included 'cause that just came out within the last --
DR. BEHLING: Yeah. Yeah, it just was published in the last Journal or the one before that.
MR. PRESLEY: Okay, so we can say 19's complete? (Unintelligible) about that?
MS. MUNN: (Unintelligible). They had somewhat of a different circumstance in the Marshalls than (unintelligible), but do you think it's applicable?
DR. BEHLING: Well, I'm not so sure it's all that different. The atmospheric tests there and -- certainly a higher magnitude, but the ratio between beta and gamma probably is not too different.
MS. MUNN: It says here the resolution included development of time-dependent beta/gamma ratios and procedures out for estimating the pre-1966 time period, so --
DR. ROESSLER: Is it Neil -- Neil Barrs*?

DR. BEHLING: Neil Barrs.
DR. ROESSLER: That was in the --
DR. NETON: Yeah, I was trying to come up with that.
DR. BEHLING: Yeah, I was just (unintelligible).
DR. ROESSLER: -- October issue.
MR. PRESLEY: All the stuff that was pre-'66 was for above-ground, which I can see what Hans says there about the Marshall Islands. You know, it -- you -- you -- everything's above-ground there and everything's above-ground prior to '66.
MS. MUNN: You think there's a possibility it might change the time-dependent ratio that (unintelligible) develop here?
DR. BEHLING: I think he also has a time-dependent relationship. In fact, it's also -- he probably fine-tuned it in the most recent *Health Physics* article, but he also published in *The Green Book*, which was the DTRA manual. I think you'll see the same tables there.
MR. CLAWSON: Doesn't it say here that NIOSH will issue a procedure for establishing this, but there's nothing -- there's nothing left for

the working group. But how do we tie that up that --

MS. MUNN: Well, it's done --

MR. PRESLEY: The evaluation's been completed and discussions included in the Chapter 6 revision. But now are you all going to do anything further than that with this new...

MS. MUNN: Well, that's the question. Hans is raising the question should (unintelligible) --

DR. BEHLING: Yeah, I haven't --

MS. MUNN: -- report be --

DR. BEHLING: It should at least be looked at --

MS. MUNN: -- looked at.

DR. BEHLING: -- and see, you know, how -- how does that compare to -- to what is being proposed here.

DR. NETON: I think that's reasonable.

MR. PRESLEY: Can we say then that NIOSH will look at --

DR. NETON: Are you following that, Gene?

MR. ROLLINS: I'm not sure that I am.

DR. NETON: Well, there's an article that just came out in the October issue of *Health Physics* that dealt with these time-dependent beta/gamma

ratios by Neil Barrs, and Hans is suggesting we at least need to look at it to see if it's consistent with what -- what has been developed by us.

MR. ROLLINS: Well, was this specific to the NTS situation?

DR. BEHLING: Not to NTS, but these were done in behalf of the DTRA dose reconstruction project involving the Pacific Proving Ground, but certainly they're comparable.

MR. ROLLINS: Yes, I would think so. It seems to me -- yes, that report has been reviewed and our revision is reflective, but I do remember now because I didn't work on that directly. That was Jack Fix and Dick Griffith worked on that, and I do remember them passing the Barrs report back and forth.

DR. NETON: Okay.

MR. ROLLINS: So in fact I think that's what they used.

DR. BEHLING: Okay.

MS. MUNN: Oh, that would be good. Well, if you could verify that, then there would be no further action.

MR. ROLLINS: In fact you just gave -- I just

learned what that Barrs report was because I didn't know what it was, but now you've filled me in, so that's good.

DR. NETON: There's probably a Barrs report that ended up becoming the *Health Physics* publication.

DR. BEHLING: Yeah, it's in *The Green Book* as well.

DR. NETON: If it's *The Green Book* then we've got it.

MS. MUNN: So do we have an action or not?

MR. PRESLEY: Well, I put down here NIOSH will look at the beta/gamma ratios and I'm going to put down they can report back to us that it's been -- that it's in the data that they're using.

MS. MUNN: That the latest report --

MR. PRESLEY: Yeah, that the latest report (unintelligible) --

MS. MUNN: -- (unintelligible) significant differences.

MR. ROLFES: We did use the DTRA document, but I'm not certain if it's the one published in recent --

DR. NETON: You can check that.

MR. ROLFES: -- but we can just verify that very simply.

MS. MUNN: Okay.

MS. SMITH: This is Cheryl. Actually Griffith went to the Hicks data and developed his beta/gamma ratios from that data. It's -- it's very comparable -- it's not identical, of course -- with information in the Barrs article or the Barrs document.

MS. MUNN: Well, I would hope we'd only be looking for major significant differences. And if there are no major significant differences, then I can't see an issue.

MR. PRESLEY: Okay, is everybody happy with that?

MS. MUNN: That won't take a significant commitment, will it?

MR. PRESLEY: I would not think that it would. You seem to think that it's just a matter of asking a question.

MR. ROLFES: I think we could have a couple of questions and get it resolved.

MS. MUNN: Good.

MR. PRESLEY: Twenty, there appears to have been --

DR. NETON: This is the same --
DR. BEHLING: (Unintelligible) interesting --
DR. NETON: This is the same as 11(d). Can we consolidate these somehow so that we don't keep having these recurring --
MR. ROLFES: I might be able to do that if it's all right with the Board.
MR. PRESLEY: That'd tickle me to death. I'm going to put a note up here that this will be consolidated.
DR. ROESSLER: And we now know what statistical methods are being used, so -- end of this issue.
MR. PRESLEY: Twenty-one, TBD does not contain information about internal or --
DR. ROESSLER: Extremity.
MR. PRESLEY: -- extremity dosimetry. We marked the action complete on this. Anybody have anything else?
MS. MUNN: Done. Right?
DR. ROESSLER: Right.
MS. MUNN: Similarly, comment 22.
MR. PRESLEY: Twenty-two, there are no new (unintelligible) data of 1966 and we've got that marked action complete.

MS. MUNN: We've agreed on all those ratios, and it's been incorporated into the guidance. Right?

MR. ROLFES: Gene --

MR. PRESLEY: Still waiting on Chapter 6 revision to come out. That's got to be done. Am I -- am I correct on that?

MR. ROLFES: That's correct. Gene, you have incorporated this into the latest revision and you are just waiting to send it to NIOSH for final review. Correct?

MR. ROLLINS: That's the response to 22?

MR. ROLFES: Yeah.

MR. ROLLINS: Is that what we're discussing?

MS. MUNN: Correct.

MR. ROLFES: Yes.

MR. PRESLEY: Yes, sir.

MR. ROLLINS: Yes.

MR. PRESLEY: Twenty-three -- do we have any further discussion on 22?

(No responses)

Twenty-three has to do with response five again.

MS. MUNN: Yeah.

MR. PRESLEY: Also has to do with Chapter 4

revision, resuspension of doses.

MS. MUNN: No further action by us.

MR. PRESLEY: Is that acceptable?

MS. MUNN: Waiting for the train to come in.

MR. PRESLEY: Going to be doing a lot of reading, I can see, when that does come. 23(b) the same thing? Make sure -- nobody has a problem with that.

MS. MUNN: No, model's approved. We do have the model approved. Right? Or do we? Is the model approved?

MR. ROLFES: The resuspension model? No.

DR. NETON: No.

MR. ROLLINS: This is Gene Rollins. No, we're going to develop the model with the justification and provide that to the Board. That's an action for us.

MR. PRESLEY: Okay. Is that going to be done in December or are you looking at that in January? I didn't mean to put you on the spot.

MR. ROLLINS: Well, I don't want -- it won't be just myself doing this so I -- and I hate to commit other people before having even talked to them about it. I think it would be reasonable to think that we could get something

done in December, but I really would be hesitant to commit to that time frame.

MR. PRESLEY: Okay. That way Lew can hold a place on the -- on the table for it.

DR. WADE: That's right, I can.

MR. PRESLEY: Okay. Anybody else have anything else?

MS. MUNN: Nope.

HIGH-FIRED OXIDES

MR. PRESLEY: Twenty-four, the presence of high-fired oxides. We'll be talking here till tomorrow.

DR. NETON: Well, not necessarily.

DR. BEHLING: Is there any reason to assume that you don't have super S?

DR. NETON: No.

DR. BEHLING: I mean given -- given the high temperatures.

MS. MUNN: It says Mark was going to verify.

DR. NETON: I can tell you that I've measured plutonium in a lot of samples that came from fallout and they're pretty insoluble. You had to go to sodium pyrofluorate* fusion -- sodium fusions to get those things in solution, so I think the case is that there are -- there are

super S and our -- this OTIB, whatever it is, 50 -- I can't remember the number right off --

MS. MUNN: Was it 52?

DR. NETON: The TIB that's going to deal with the super S is going to be applicable complex-wide, with certain caveats. I guess one could arg-- one could speculate as to whether it's even more insoluble than the super S that we've seen at other locations, but --

MS. MUNN: Well, we can take off the words that say Mark's going to verify that. We can say the OTIB in progress is complex-wide.

DR. NETON: Yes, it will be. Again, given certain caveats. It wouldn't necessarily be applicable to the ceramicized plutonium particles at Los Alamos, but... I think it would be hard -- we'd be hard-pressed not to consider these to be super S plutonium. That was easy, Mark.

MR. PRESLEY: Twenty-five -- yeah, it was a whole lot easier than I thought it'd be.

MS. MUNN: How far -- how are we doing with that OTIB with that high-fired super S stuff?

DR. NETON: I want to say that it's done, but it hasn't been signed by -- I haven't signed it

yet, but the last I heard it was -- we'd come to resolution with SC&A on all of the models and such. I think we are waiting -- well, we weren't going to wait for the final revision -- review by SC&A, which was Joyce Lipsztein and others looking to see if they could find cases in -- that were more refractory, more insoluble than our so-called design case we chose.

MS. MUNN: But even if they do, that will be --

DR. NETON: It would be a modification and it will be incorporated, but the nuts and bolts of the proce-- the OTIB are done and --

MS. MUNN: So the heavy lifting's over with and --

DR. NETON: Oh, yeah.

MS. MUNN: -- you're just polishing now, good.

SITE EXPERT REVIEWS

MR. PRESLEY: Item 25 deals again with the documentation of site expert reviews, and it brought to our attention that SC&A was not getting some of the reviews. And I was wondering where -- have we been able to get them what they've asked for -- all except the classified stuff?

MR. ROLFES: Gene, have we provided any

additional interview notes to SC&A or have you sent me anything recently --

MR. ROLLINS: I'm going to -- we -- what we did, we collected all of our interview notes, all of our recollections -- it was really a quite extensive list, and all of our e-mails and everything, and what we have done -- and I don't know what the status is, but we were sending those out to a derivative classifier at the Nevada Test Site to get the okay to distribute those. That was our instruction, to do that. And I don't know where we are in that process right now, but I will find out and get back to you.

MS. MUNN: Good.

MR. ROLFES: There were also -- Gene, there were also some interview notes from SC&A I believe that we were requesting. Is that not true?

MR. ROLLINS: If they have some that they would like to share with us, I think that would be a good thing.

DR. ROESSLER: I remember that coming up at a meeting (unintelligible) --

MR. ROLFES: I think we had requested that and

we have yet to receive those, as well, from SC&A.

MS. MUNN: And I thought there were going to be some internal phone conversations about --

MR. ROLFES: Yeah, I haven't received them. I haven't been -- that hasn't been followed up, so...

DR. WADE: Why don't -- then maybe you could call Arjun --

MR. ROLFES: Uh-huh.

DR. WADE: -- I mean there seems to be concerns on both sides, so I mean let's just work it out and swap stuff.

MR. PRESLEY: That's what I'm going to put here, interview notes are in the hands of the DC at NTS and NIOSH also has not received notes from SC&A, and then I'll put a note here that Mark will get with Arjun.

MR. SMITH: Hey, Gene, this is Billy. Did you see the interview that I did with SC&A?

MR. ROLLINS: I don't believe I have.

MR. SMITH: Tom Bell took my -- some -- interviewed me about two years ago, so that's -- that's something that's in their hands that you haven't seen.

DR. BEHLING: (Off microphone) (Unintelligible)

MR. PRESLEY: Does anybody else have anything about the 25 issues -- Mark? -- that you want to bring back up? Jim? Hans?

(No responses)

One of the things that I would like to bring up on the table is do we have a list of items that are specific to all sites that we're looking into right now?

DR. NETON: Yes, we're compiling that.

MR. PRESLEY: Okay. Okay.

DR. NETON: Brant Ulsh came back from the Nevada Board meeting with a list that you guys started, and he's polled the health physicists for other issues that should go on that list, so we've expanded it some. So we do have that list available and that's the list that we'll speak from at the next Board meeting as to the status on where we are with these things.

MS. MUNN: That will be so helpful.

MR. PRESLEY: Brant brought a concern up about we've -- we've got here no action required, no action by the working group, but we have all of the data that's not complete on Chapter 2, 4, 5 and 6, I believe, and when that comes out we

want to set down and really go through that with you all, and I guess Arjun, and make sure that we've covered all those things and we're not going to get down -- two or three meetings down the road somebody snakebite us.

MR. CLAWSON: Everything's pending on that.

MS. MUNN: I hope we don't have another two or three more meetings. I hope we're getting real close to the point where we --

MR. PRESLEY: I do, too, but I mean -- what I'm talking about going af-- after we do this and say yeah, the site profile -- you know, we make a recommendation to accept or delete, whatever it be, but I'm talking about down the road from that somebody come back and say oh, you all didn't do this. That -- I want to make sure that we cover all the bases on this so that doesn't happen. This one's been not as complex as some, but it's been quite complex.

MS. MUNN: Well, if we cover the bases that matter, then that's really and truly the best I think anybody can do. There's always going to be some minor detail somewhere that can be worried out of the matrix.

DR. WADE: But I think Robert's point -- and I

think it's a generic one that -- let's say that we come to a very knotty issue, there's good discussion, there's agreement intellectually that a certain action will happen and then we remove it from the list. There needs to be some follow-up to see that that action happens. And that's something that we -- NIOSH I think have to be prepared to offer to the Board. This is following on beyond the action of the working group to see that those commitments are actually followed up upon and in the way that was agreed upon. So I mean I think that's something that we need to, at this December meeting, talk about as well, what's the mechanism for that.

MS. MUNN: I hope so. I would hope that it would become a standard part of our agenda so that, just as we see our caseload changing from meeting to meeting, we would also see the action items -- the outstanding action items changing as well.

MR. CLAWSON: This may not be the time or the place, but something that's been bothering me that I've started to see pop up is -- let's take like Los Alamos, the lanthium (sic), I

believe it was lanthium?

MS. MUNN: Uh-huh, lanthanum.

DR. ROESSLER: Lanthanum.

MR. CLAWSON: Okay. Now they were covered for that, but it's interesting because where was that processed at, where was that manufactured at? Are we looking at what came into this? And so I've dug into a little bit of it. It was Idaho, and that doesn't even show up in our TBD, so one of the things I want to kind of see is when we do find these -- these oddball things, that we trace it back so that we can't get beat on later of -- here you covered it at Los Alamos and where it was manufactured and produced was -- it doesn't even show into the technical database. And somehow I'd like to be able to keep track of that the same 'cause we've got many sites, and each one of these sites are unique in several aspects. But when we find these -- I guess the term's wrong, but oddball little issues like this, we come to find out where they came from and make sure that they're addressed, that that's in the profile, too.

DR. WADE: That's obviously a valid point. I

mean do we want to put that on the agenda for the next meeting? I mean this is sort of tracking beyond a facility, sort of the birth to death realities of certain materials. I mean do -- I don't know, what's our -- do we do that? Do we look at...

DR. NETON: I think we do it. We haven't formalized that process at all, though. I'm wondering if this wouldn't be something to put on the overarching issues list just to -- as a placeholder at this point to --

DR. WADE: Can you put it -- can you see that it goes on the list?

DR. NETON: I'll put it --

DR. WADE: I mean that list will be brought up before the Board in December.

DR. NETON: Right. It may not be a perfect spot for it, but my thinking is --

MR. CLAWSON: Well, and I'm trying to figure out how to put it, too, because I've seen some of these overarch-- these issues appear with Savannah River, certain oddball things, and they came out of Y-12 I believe it was. All of these sites are intertwined uniquely --

DR. NETON: Oh, yeah.

MR. CLAWSON: -- from certain different little processes.

MR. PRESLEY: Especially your production sites.

MR. CLAWSON: Right, and I've -- I've just seen that these things come up and we cover it at one site, but we never take where it came from. And lanthium (sic) was the interesting one to me because --

MS. MUNN: Well, it surprises me that you didn't find any indication of it, though.

MR. CLAWSON: It's not in -- well, and -- that's a pretty big site profile that I've been going through on -- just Idaho, and in going through it I hadn't seen anything on it. Now there may be a little blurb or something that I missed. But see, this was part of the process and I want to make sure that we're covering --

MS. MUNN: Yeah --

DR. NETON: That's an excellent --

MS. MUNN: -- that's an excellent point, but the other point that goes along with that is that it may or may not be significant on one site, but might be quite significant on another and that there's an obvious connector (unintelligible) --

MR. CLAWSON: Well, and the way I found into it was this was produced by the NTR reactor, which only found four people that even have knowledge of it and they pulled this out of the reactor, super fast, put it in and shipped it because of the very short half-lifes.

MS. MUNN: Hot stuff needed to get to where it was going.

MR. CLAWSON: Right, and -- and it didn't -- it didn't show anything like this, and I just want to make sure that we're covering our bases on --

MS. MUNN: Yeah.

MR. CLAWSON: But I don't know where to bring it up and I apologize if this is the wrong place.

DR. WADE: No, this is it --

MS. MUNN: This is the right place.

DR. WADE: -- you put it in the list, then I would ask you, when that list is up there, then you need to embellish the point and --

MR. CLAWSON: Okay.

DR. WADE: -- and then the Board could decide in various ways to deal with it. It could ask NIOSH to do it. It could ask SC&A to do it.

They could form a working group. I mean there are vario-- I mean this is sort of a continuity issue --

MS. MUNN: Yes, it is.

DR. WADE: -- around the complex. It makes sense.

MR. CLAWSON: Well, we've seen it with so many sites, we're -- we're all intertwined. Idaho sits there with Y-12, it's got almost something from every one of these sites. And how it got there, it's sometimes -- it's an unknown. It just all of a sudden appeared, you know.

DR. WADE: You think?

MR. CLAWSON: Yeah. Yeah, I'm sure there's documentation, though, at -- somewhere.

DR. WADE: Well, I think that's an excellent point.

MS. MUNN: Yes, it is a good point.

DR. WADE: So not only is this working group sort of doing its work on Nevada Test Site, but you're also sort of blazing the trail in terms of overarching issues and tracking, and I think those are things that we really need to focus more on -- now that we have stuff to track. The other issue, to make it more complex as it

relates to SC&A, is that if NIOSH says we're going to do -- there's an intellectual agreement and NIOSH says we're going to do this, then one question is was that done, and then does the Board want its contractor to review what was done to see that it has met the spirit of that agreement. Or does the Board want to do that or do you want closure not only in terms of checking a box, but in terms of looking at content. And you know, that's something the Board can take up when we have these discussions.

MS. MUNN: That would be a second tier issue for the Board.

MR. PRESLEY: We might be able to go back -- the item that Brad's talking about may have already been addressed by ORAU in some of their data mining, so to speak, about what radionuclides and what materials are on each one of the sites. It may be, Jim, that -- Mark -- one of you all need to ask ORAU by chance has that been done, and it may have been. 'Cause we used to -- one of the things that we used to do at Y-12 was every year you had to report to a DOE oversight committee the

chemicals that you had on site. And that list was very, very extensive 'cause I was the person at Y-12 that did it the last two years before I retired. And I think that this -- it may be easier than we think. Now it may be harder to check it --

MR. CLAWSON: Well, I know that the chemicals -- because you've got a chemical database that you're tracking, and they did a really good job on that. And I just have to take from my personal experience, I was told up until 1995 that we had no plutonium in the raw uranium. Okay? So that -- you know, that brings up -- that brings up the issue until we had for -- that they classified as positive -- false positive, and now all of a sudden -- we all that have been involved with this know that plutonium is a natural byproduct and there always is going to be some there. So I just want to make sure that we're covered on this and maybe track -- as we get into these issues, I'd like to look at that and maybe we could discuss it more in December and go from there.

DR. WADE: I think it's an excellent suggestion.

MR. PRESLEY: (Unintelligible) something to me needs to be done.

DR. WADE: It does. I mean it's sort of what you would expect, as this program matures, that you would start to have the intelligence and the time to look at some of these sort of broader issues, and look for some continuity within the system, where there should be continuity.

MR. CLAWSON: Well, as a new person coming on to this, what has really surprised me about everything is how all these sites are intertwined with one another, in many different aspects and in many different programs, bits and pieces and so forth like there, and I just want to make sure we're covering this.

MS. MUNN: Thank you.

MR. PRESLEY: Anybody else have anything else?

DR. WADE: I'd like to thank the workgroup particularly for making the effort, and I think it was a productive day on many levels --

MS. MUNN: Yes.

DR. WADE: -- not only the Nevada Test Site, but also these other things. And it's wonderful to see Jim back at the table and --

MS. MUNN: It sure is.

MR. PRESLEY: What I want to say, it's good to see Jim back, and I want to thank Mark for all of his work because I know he's pushed to get this done. And Jim, than you for being here and adding your expertise.

DR. NETON: Good to be back.

DR. ROESSLER: I appreciate the Cincinnati people for coming to this hotel so those of us who travel don't have to go all the way down to your offices.

MR. PRESLEY: Yeah.

MS. MUNN: Yes, very much appreciated. It's all I can do to get here from the airport, much less back across the river and up to NIOSH.

DR. WADE: While we're passing out thanks to Hans for making the trip. Obviously you must be a bit under the weather. You seem to be --

DR. BEHLING: Well, I've got this beautiful case of oak poison over the weekend so that's why my face is just -- you know, I just feel like -- it's torture on my face and I hope (unintelligible) is working a little bit here.

MS. MUNN: I hope so.

DR. WADE: So we doubly appreciate the effort.

It's always a pleasure when you join us.

DR. BEHLING: Yeah, I was cutting down trees and I know I'm very, very allergic to poison ivy and oak. I was wearing gloves, but I got a lot of sawdust in my face and I just wiped my face with the gloves that must have had some poison on it and I know better than that.

DR. WADE: What can I tell you, it says it all.

MS. MUNN: (Unintelligible) try to keep you from contaminating yourself. There you go.

DR. WADE: Thank you all. Travel safely.

MR. PRESLEY: Thanks to everybody.

DR. WADE: Thank you on the phone for your contribution.

MR. ROLFES: Thank you, Gene, Cheryl and Billy.

MR. SMITH: Okay, Mark.

DR. WADE: The Board will next begin its activities at 10:00 tomorrow morning with a subcommittee meeting, and you all are welcome to join.

(Whereupon, the meeting concluded, 1:45 p.m.)

CERTIFICATE OF COURT REPORTER

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I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of November 15, 2006; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 7th day of January, 2007.

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STEVEN RAY GREEN, CCR

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