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

WORK GROUP MEETING

NEVADA TEST SITE

ADVISORY BOARD ON

RADIATION AND WORKER HEALTH

Following is the verbatim transcript of the Nevada Test Site Working Group Meeting of the Advisory Board on Radiation and Worker Health held in the Suncoast Hotel and Casino, Las Vegas, Nevada, on Jan. 7, 2008.

STEVEN RAY GREEN AND ASSOCIATES
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TRANSCRIPT LEGEND

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In the following transcript: a dash (--) indicates an unintentional or purposeful interruption of a sentence. An ellipsis (. . .) indicates halting speech or an unfinished sentence in dialogue or omission(s) of word(s) when reading written material.

-- (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.

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ROLFES, MARK

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MAKHIJANI, ARJUN
MAURO, JOHN
OSTROW, STEVE
ZLOTNICKI, JOE

P R O C E E D I N G S

(7:05 p.m.)

(Note to reader: No audio-visual support was supplied for this meeting unfortunately. Please understand the following is the best effort of the court reporter, given the extremely difficult audio circumstances. The ^ symbol designates speech lost due to inaudibility.)

OPENING REMARKS AND INTRODUCTIONS

DR. WADE: This is a meeting of the work group of the Advisory Board. This is the work group that focuses on the Nevada Test Site site profile. That work group is chaired by Mr. Presley, members Clawson, Munn and Schofield and Roessler. All but Roessler are in the room.

And, Gen, I understand you're on the telephone with us.

DR. ROESSLER (by Telephone): I'm on the phone.

DR. WADE: Good. Well, we wish you well and hope you can hear us. If at any point you have difficulty, please just holler out, and we'll try and reposition the microphones and encourage the low talkers to speak more

forcefully.

I guess we'll go around and do our introductions here in this room. Again, Nevada Test Site site profile. So I would ask members of the NIOSH/ORAU team or the SC&A team to identify whether or not they have any conflicts relative to this site, and we'll start in this room.

Again, my name is Lew Wade. I work for NIOSH and serve the Advisory Board.

MS. MUNN: Wanda Munn, member of the Board.

DR. MAKHIJANI: Arjun Makhijani, SC&A, no conflicts.

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

DR. OSTROW: Steve Ostrow, SC&A, no conflict.

MR. SCHOFIELD: Phillip Schofield, member of the Board, no conflicts.

MR. CLAWSON: Brad Clawson, member of the Advisory Board, no conflicts.

MR. ROLLINS: Gene Rollins, ORAU team, no conflict.

MR. CHEW: Mel Chew, ^, no conflict.

MR. ROLFES: Mark Rolfes, NIOSH health physicist, no conflicts.

MR. PRESLEY: Robert Presley, member of the Board, chairman of the working group, no conflicts.

DR. WADE: Okay, we're going to start, please shout out --

MR. ELLIOTT: Larry Elliott from NIOSH, no conflicts.

MS. CHANG: Chia-Chia Chang, NIOSH, no conflict.

MS. HOMOKI-TITUS: Liz Homoki-Titus, HHS, no conflicts.

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

DR. NETON: Jim Neton, NIOSH, no conflicts.

MR. SMITH: Billy Smith, O-R-A-U team, conflicted.

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

MR. RICH: Bryce Rich, O-R-A-U team, conflicted.

MS. DEMERS: Kathy Robertson-DeMers, SC&A, no conflict.

DR. WADE: Please introduce yourselves, please.

MR. FUNK: John Funk, Atomic Veteran Victims

of America, no conflict.

DR. ANSPAUGH: I'm Lynn Anspaugh, a consultant to SC&A, conflicted.

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

MS. ZACCHARO: Mary Jo Zaccharo, ORAU team, no conflicts.

DR. WADE: Before I ask for other introductions on the phone, are there any other Board members other than Gen Roessler who are contacted by telephone?

(no response)

DR. WADE: Any other Board members?

(no response)

DR. WADE: Okay, so we don't have a quorum of the Board which is good. We can continue with our work group deliberations.

Let me now ask other members of the NIOSH/ORAU team who are on the telephone to identify themselves. Other members --

MS. SMITH (by Telephone): Cheryl Smith, ORAU team, no conflict.

DR. WADE: NIOSH/ORAU?

(no response)

DR. WADE: One last time, NIOSH/ORAU?

MS. HOFF (by Telephone): Jennifer Hoff, ORAU team, no conflicts.

DR. WADE: NIOSH/ORAU?

(no response)

DR. WADE: SC&A team? SC&A?

MR. ZLOTNICKI (by Telephone): Joe Zlotnicki, SC&A team, no conflicts.

DR. WADE: SC&A team members?

MR. ZLOTNICKI (by Telephone): By the way, while I'm on -- this is Joe Zlotnicki -- I probably could only hear one-third of the people who were named, calling out in the room. Normally on the conference calls I can hear everyone.

DR. WADE: Okay, now our configuration here has certain people at the table, most of the people away from the table.

Phillip, could you speak a bit?

MR. SCHOFIELD: Yes, can you hear me from here?

DR. WADE: Could you hear Phillip Schofield?

MR. ZLOTNICKI (by Telephone): I could hear someone was talking, but I couldn't hear what was said.

MR. PRESLEY: Could you hear this? Sir?

(no response)

DR. WADE: Let's look at those microphones. I think the microphones are off.

Can you hear me through this microphone now?

MR. ZLOTNICKI (by Telephone): I can, yes.

DR. WADE: We're just going to have to speak up. I would ask all of us to speak up. If need be, we'll move the microphones.

Let me ask other, any other federal employees who are on the call participating as part of their employment?

(no response)

DR. WADE: Other federal employees on the call?

(no response)

DR. WADE: Are there any workers or petitioners, claimants, members of Congress or their representatives on the call who would like to be identified?

(no response)

DR. WADE: Anyone at all on the call who would like to be identified?

(no response)

DR. WADE: We're going to begin. Again, I

would ask those of you on the telephone if you're not speaking directly or involved directly, please mute your instrument so we don't have any background noise. We will try and speak up. If anybody out there is severely limited, just call out, and we'll try and do the best we can. I would ask everyone around the table though to try and use volume so that those on the telephone can hear us.

Robert, please.

INTRODUCTION BY CHAIR

MR. PRESLEY: Gen? Gen Roessler?

DR. ROESSLER (by Telephone): Yes.

MR. PRESLEY: Can you hear us?

DR. ROESSLER (by Telephone): I can hear you. I can hear most everybody. Some of the backgrounds, the people sitting away from the table are difficult to hear.

MR. PRESLEY: Okay, I just wanted to make sure you could. You feeling all right?

DR. ROESSLER (by Telephone): I'm feeling okay.

MR. PRESLEY: Good. We miss you.

DR. ROESSLER (by Telephone): Thank you.

MR. PRESLEY: What I would like to do is I'm

going to start out. John Funk has asked to talk to us, and I've told him that he has ten minutes. It's been an awful long day for a lot of us. And so I'm going to let John speak first. And when he's through then we're going to go through the items on the matrix that are open. We have two items that are open. And hopefully, we can come to some conclusions after we go through these matrix items. Is that agreeable with the working group?

John?

ADDRESS BY MR. FUNK

MR. FUNK: Mr. Presley, members of the work group and the Nevada Test Site profile, thank you for the opportunity to present the material to you. I worked for several years at the NTS during the 1970s, '80s and '90s and have taken great interest in your work. And I've spent a great deal of time reviewing the site profile or the technical base document for the NTS.

In November I submitted to Mr. Elliott more than 50 comments on the site profile document. I received a response in the form of the matrix on December the 17th with an

invitation to participate in the December the 19th phone conference. I understand that members of your group received copies of that matrix. I regret that I was not able to participate in this conference call due to prior commitments, doctors' appointments.

With rare exceptions my comments were summarily dismissed by an unidentified health physicist recruited by Mr. Elliott. Now I don't have hundreds of millions of dollars at my disposal to pursue these issues. I can't afford to hire a health physicist to help me. I'm a retired carpenter, but I do have one compelling advantage. I worked at the Nevada Test Site, and I know what went on there from personal experience.

I don't have to depend on random conversations from other persons although I have consulted with many other persons. I know that you don't have time for a lengthy discussion on this issue raised by me, but I would like to make a few comments. I will limit myself to the first two issues I raised and to some important new information that's recently come to my attention.

The first issue in my set one was concerned with job titles which I do not think was an accurate reflection of the positions accurately in use at the NTS during the period of my work. The NIOSH response was that the list which was given to O-R-A-U-T T-K-B, ^ revision that was compiled from the RECO position description received from Martha DeMarre. Excuse me, was compiled from the RECO position description received from Martha DeMarre.

However, I invite you to examine my Attachment 5 which is a part of O-R-A-U-T document. Here it states that the RECO job titles, indices and position descriptions were from 1992 to ’93 for the crafts. This is an example of very serious and common problem situations. And 1992 to 1993 cannot be assumed to be the same as they were in ’63 to ’92 period of interest to us.

Issue two is similar in that I know that collinary (ph) administrative workers did work in a testing area. And I’ve personally seen them in the tunnels. The NIOSH response implied that I’m too stupid to know the

difference between controlled areas and radiological areas. Then the response goes on to say the radiological areas are posted with radiological conditions and requirements necessary to enter the area.

Notice the use of the verb “are”. Once again the unidentified health physicist does not seem to know that, or not concerned with current conditions. My attachment, the health physicist in 1996 shows clearly the scientific basis for posting requirements -- excuse me, I got ahead of myself.

Radiological areas are posted with radiological, between controlled radiological areas. Then the response goes on to say that radiological areas are posted with the radiological conditions and the requirements necessary to enter the area.

Notice the use of the verb “are”. Once again the unidentified health physicist did not seem to know that we are not concerned with current conditions. My Attachment 2 is a paper published in Health Physics in 1996 that shows the scientific basis for ^ had not yet been established for the Nevada Test Site. I

personally witnessed the presence of collinary (ph) and administrative workers in areas that were radiological areas in any sense of the words.

I won't challenge your patience with additional comments on this issue I've previously raised. I only used those two as they were the first ones on the list. Now I would briefly like to turn to other areas of importance regarding the competence of the site profile.

Mr. Rollins has said on numerous occasions that air samples were taken at the NTS starting only in 1971. My Attachment 3 is an environmental monitoring report from July 1964 through June 1965. Page three is a map of the areas where air and other samples were taken during that time period. Air samples were clearly being taken at the NTS more than seven years prior to that indicated by Mr. Rollins.

Although the data was not nicely tabulated in the early annual reports, the data are available on microfiche. You can note from the map that the few areas of

offsite were included with one labeled 51 where all types of samples were collected. More information is given on page A-2 where it is shown that a lot of attention has been given by RECO to personnel through Area 51.

Further information about Area 51 is given in my Attachment 4 which is abstracted from publication for sale at the Atomic Testing Museum. This area is not included in the site profile although personnel from the Nevada Test Site worked there. These areas and facilities are not included in the site profile.

Area 51, Attachment 3 and 4, Barrie Reactor Experiment BRN in Area 4 in 1962. Attachment 5, High Energy Neutron Radiation Experiment, HENRE, in Area 25. Attachment 5, Plutonium Disbursement Experiments, both onsite, offsite, resulting clean-up operations. Attachment 6, Super Kookala. Attachment 7, Other Offsite Locations, Attachment 7. Tweezer Facility, Attachment 4, items two, three and five would have been sources of high energy and thermoneutron exposure. Item two is particularly troubling

because the BRN activities were in Area 4 in 1962 when there was no monitoring for thermonuclear exposure. The BRN tower would have been a few miles of significant occupation activity. The possible exposure conditions in Area 51 and the Tweezer Facility have not been made available to the general public.

In conclusion, I think there are serious flaws in the site profile document. Personnel from NIOSH has consistently failed to make corrections even though this process has been ongoing since 2001. We deserve a timely accurate site profile. So far we have had neither. It is time to say enough is enough. NIOSH is evidently unwilling to devote the necessary resources to this important site which is clearly the most complicated one in the complex.

Thank you.

MR. PRESLEY: Thank you, John. And all the Board members and interested parties have John's attachments. And we will look at them, go through them. I appreciate your input, and we'll go from there.

Thank you, sir, appreciate it very much.

RECAP OF ISSUES

When we last met in December 17th, is that right? Nineteenth, we had two open issues. What I would like to do is, those issues being 11 and 20. I'm going to go back and just state each one of these concerns, what we did and --

DR. MAKHIJANI: What matrix are you working on?

MR. PRESLEY: The one that we had. The same one we used last time. My notes are all on that one, and that's the last thing we had, 12/17/07, final document.

Item one, we marked that closed, and it is being revised.

Item two, we marked closed, and there is some verbiage being added to that item.

Item three, we closed that item. We are waiting for a TBD 5.01 to be finished up. Is that correct?

MR. ROLFES: I believe we're going to incorporate a reference into the document to describe some of the tunnel re-entry survey

procedures and access controls.

MR. PRESLEY: Okay, items two and three then are marked closed.

Item four, we changed the wording on that particular item, the last item on that. We changed the wording, and I've marked it closed.

Items five, seven, 15 and 23, we marked closed.

Items eight, nine and ten were marked closed.

ITEM 11

Now we come up to item 11, and NIOSH has sent out a, I mean SC&A, ya'll -- bear with me tonight. It's been a long day. SC&A sent out their comment list. We asked them at our meeting to comment, and I'm going to ask Arjun if he would go through his comments. And then we will go back and do our questions after Arjun has a chance to go through this.

DR. MAKHIJANI: We had a team of people look at this actually, and I'm going to give you a little summary and then turn it over to Joe Zlotnicki who put all the comments together. He's on the phone. He's the man who could not

hear very well.

Joe, can you hear me?

MR. ZLOTNICKI (by Telephone): Yes, I can.

DR. MAKHIJANI: The main, just to restate the issue for those who don't have a matrix in front of them, but comment 11 is about correction factors for external environmental dose using geometry of origin relative to badge and angular dependence of the dose conversion factor. And the comment was that correction factors need to be developed.

And NIOSH has a lengthy response which I won't read, but we felt that the response would be satisfactory conditional on three factors which we analyzed and examined and thought in a couple of cases some things needed to be done. And the three factors were: the photon energy distributions were above the levels where there could have been substantial missed dose. So that was one issue that we examined.

The exposure settings were such that the annual incidence of photons did not defer much from normal. So that was another assumption that was imbedded in the NIOSH

analysis. And job types can be reconstructed and appropriate adjustment factors can be applied. So we felt that NIOSH's response has these three assumptions imbedded in it, and if they were correct, then the analysis would be okay.

Joe, do you want to go through our analysis on each of those factors based on our paper?

MR. ZLOTNICKI (by Telephone): I can do that, yes.

DR. MAKHIJANI: Why don't you go ahead.

MR. ZLOTNICKI (by Telephone): I'm sorry, can you hear me?

MR. PRESLEY: It's good.

MR. ZLOTNICKI (by Telephone): Arjun, can you hear me?

DR. MAKHIJANI: Yes.

MR. ZLOTNICKI (by Telephone): So the first one was energy distributions, and so not to waste any time, we said we felt that was a reasonable assumption. Any missed dose could be accounted for by the over-response of the film to low energy photons. And therefore, we felt that that was reasonable and claimant

favorable.

For angle of incidence there are two things going on in parallel here. One is what happens when a badge is exposed from an angle and not from straight in front of the person or of the badge. And the second is what happens when the organ in the body is exposed from the side and not the front.

Basically, in general, if you're exposed from the side or the rear, most of the organ dose conversion factors are more favorable than if you're exposed from the front. In other words your body is slightly better shielded, if you will, from the side to the rear than from the front in terms of critical organs.

However, with a badge a lot of different things are going on including the fact with film that if low energy photons manage to reach film emulsion, they can cause a very large over-indication of exposure. On the other hand if the badge is shielded by itself or by the person, for example if they're being exposed from the side or the rear, the badge may completely miss the

radiation, the photon radiation and the beta radiation.

So we have a problem in the assumption that the over-response of the film emulsion to low energy photons will compensate the under-response because the badge is partially or fully shielded from the source of radiation dependent on angle. And I think the summary would be that it might be fair to say that these two effects cancel out, but we don’t see any evidence to suggest that it actually does.

And so what we basically suggest is that either some existing material is dug up that already has done these tests for this particular film emulsion and badge holder or calculations are performed that simulates being irradiated, for example, from the walls and floors and ceilings of a tunnel, a contaminated tunnel, or actually performing the measurements using either an old badge that’s still lying around in a museum somewhere or recreating it from the available data.

So in summary, the angular exposure, for example in the tunnel or working outdoors

with a large contaminated field of radiation in literally a field or a rocky area with contamination all over the ground, it is very hard to predict how the badge is going to respond to those range of angular exposures and to the range of energies that we're seeing and to make the assumption that they're all going to cancel out. As a health physicist I have a sense that that might be true, but I don't have enough data to back that up.

Arjun, do you want me to carry on on job types as well?

DR. MAKHIJANI: The one thing I would add to that is that up to 1966 NIOSH is going to calculate or proposing to calculate the beta doses from beta/gamma ratios. So whenever the gamma dose is underestimated, you get an amplified effect when you're using the ratios on the beta dose. So this problem will carry over into the beta dose estimation of 1966 if it is a problem.

MR. ZLOTNICKI (by Telephone): Right. And then for job types, I think the petitioner a little earlier discussed this issue. We had mentioned it as well. Everything we've seen

suggests that dividing up jobs in those early years by job category and then defining the radiation exposure based on the name of a job seems to be too broad a brush to do that with. And there's nothing to indicate that that's sensible, and the things we've heard contradict that that's a sensible approach as to whether or not people would have been exposed. Particularly in this area we're talking about environmental external radiation.

One other issue, there's a claim within the comment that environmental doses were low in the response from NIOSH. Quote, "given the low environmental external exposure rates at NTS..." There are two concerns there. One is what is low. There's no definition of what low is. And the second is what's the validation that whatever that range or number is that it always was low. There are certainly many documented cases of environmental external exposure rates being high during incidents and accidents and unforeseen releases for example.

And the final comment in the document

of any significance in our response was the need for a greater use of site experts who were onsite at the time or the various times where these events went on.

DR. MAKHIJANI: And just one other thing that -- There's a fair amount of detail. It's a six-page document with comments on there or five pages of comments on one issue. But we did feel that a review of job types or geometry of organ exposure badge is necessary and was not fully addressed in the way NIOSH has responded.

MR. ROLFES: We did evaluate different dose conversion factors for environmentally contaminated areas at Nevada Test Site. And the results of our calculations indicated that the dose conversion factors which we were using are not significantly different from those that were calculated. And we felt that what we had done already is claimant favorable and to make any changes would not have any significant impact.

Furthermore, because of the low dose rates from environmental contaminated areas, it's unlikely that a positive dose would even

be registered on the dosimeter because of the low dose rates. For such a case when NIOSH receives a non-positive dosimeter result, we would assign a missed dose to that to give credit for any potential exposures from environmental contaminates.

We do have the results of calculations which we ^. I think we did provide those initially. I don't recall the date. We do have a discussion of this issue within the site profile. It's in Section 6.4.1.6. It's titled "Correction Factors for External Environmental Dose". And it does describe the assessment that was conducted for three distinct exposure geometries.

The first was exposure to ground surface contamination from an infinite plane surface which was characteristic of fresh radium product fallout. The second scenario was exposure to soil contaminated to an infinite depth characteristic of fallout that had been in place for several days to weeks and had been weathered in. The third was submersion in ^ infinite cloud characteristic of airborne radioactivity as might be

encountered in a release following an underground test. Additional details of the scenarios can be found in the site profile.

So we believe that we have adequately addressed this previously, and it might just be a matter of wrapping up loose ends with SC&A, provide data that was used in the analysis.

DR. MAKHIJANI: Let me just give you an example of what, the kind of thing that Joe and I are talking about is I was reading testimony last night of a tunnel worker. There was an instance where the radiation of several rad per hour on the, at least as I read the testimony, on the floor of the tunnel while they were doing some work there. And that’s the kind of problem we’re talking about here because if you have radiation coming from below, the angle of incidence is not normal.

We’ve got certain badges that are, certain organs that are more exposed than what the badges register and for certain organs that would be less exposed. And we went through this at Mallinckrodt, and I think actually NIOSH did an excellent set of

calculations there. And I don't remember everything from having reviewed the site profile some time back, but I didn't see any parallel effort that NIOSH made comparable to what was done over there.

And I don't think that environmental doses of the type that I'm talking about are always low. I think that is an assumption that has to be documented. We didn't find that that was generally correct.

MR. ROLFES: I think the issue that you're referring to would be covered by this scenario number one, exposure to ground surface contamination in an infinite plane surface characteristic of fresh fallout.

DR. MAKHIJANI: But it's not an infinite planar surface. It's a very small surface.

MR. ROLFES: One single small hot spot is what you're referring to. That's, I don't know if there's anybody else that might be able to help to see what our basis for the calculations were. How that might impact --

MR. CHEW: I think your speculation of scenarios --

DR. MAKHIJANI: They're not my speculations.

Sorry, I take exception to that. I'm quoting only, I'm quoting written testimony, and I believe this actually be distributed to the Board at the prior Board meeting in Las Vegas. So this should be available testimony of a worker who has passed away. So I can't say any more because of Privacy reasons, but I think the Board has this document. Or if not, probably could be given by this person to the Board. So there's no speculation on this. I'm just citing what a very experienced worker wrote about their own experience ^ experienced workers in this business.

MR. ROLFES: It's just a very small, defined area that was a high dose area where an individual would have had to have been in proximity to it for a long period of time to have accumulated any significant dose. If it was a much larger area, I would certainly see that the general background or general dose rate in that area would be much higher and an individual would likely receive much more exposure from a larger contaminated area. I would have to take a look at specifics in such a case in order to make any kind of detailed

assessment of it.

DR. MAURO: I'm trying to visualize it. I was reading between your section and your response. And the way I understand this is you have, when you calibrate the film, and it's got -- I think it was in the early '60s, I guess right after, the early '60s -- a single LN film, and it had a certain amount of lead shielding over it, you get a flat response. So that if you have low energy, you wouldn't overrespond.

And you calibrated it ^ where the source was perpendicular to the film. So now you know this amount of ^ is associated with this number of rad per hour or millirads per hour as theoretically determined ^ exact ^. And then you've got a film badge, that has been calibrated ^, ^ as calibrated in this method which is where the film is known to the ^ user.

And now you have this film badge sitting on a person. And what I understand that you've done is said, okay, now the film badge is on the person, and he's working in an area. Now your calculations say that the area

is an infinite plane. And therefore, I guess, you'd run some Monte Carlo simulations or some type of simulations of what the energy distribution would be striking the face of that film badge on the person's lapel coming from before which is close by, and then coming from every distance. And you're getting, now, in theory, you would know the response of that film badge.

And we're saying, of course, that's different than what actually was calibrated and you've still got correction factors. Now as I understand it, you're saying that whatever the reading is, let's say it's R per hour or MR per hour or millirem per hour, whatever it is calibrated at, you're saying that you're going to -- and that would have been organ dose. Let's say it's a lung dose or a dose to a new organ. You're using, your calibration factor is one.

In other words you're going to assume there is no, in other words the effect would be whatever reading it is, whether you're getting MR per hour. Let's say it's the ten millimeter depth dose that you're reading.

You're saying that the organ dose, whatever the reading is, let's say the ten millirem, that's the dose you're assigning to the new organ. Am I correct that that's, or do you have an adjustment factor to go from the reading on the badge internally, ^ adjustment?

MR. ROLLINS: There would be another adjustment factor.

DR. MAURO: Okay, so but then I guess I'm having a little problem understanding this. If it was calibrated one, okay, and then you're applying your adjustment factor to go from what it was calibrated at to some internal organ using some correction factor to some depth dose, but now we're really saying that's not the exposure setting the person's in.

Now there's a wide variety of exposure settings, some in which there are quite a bit of the exposure, especially if most of it is coming from the ground near where he is, and it's striking at some angle. And the energy could be relatively low perhaps shielded ^ the effective thickness of the lead that that film badge has experienced is no longer the

thickness that's normal, it's the thickness coming this way.

So we have all these confounding variables. Now I guess my question to you is when you ran the calculations, did you factor all of this in, the energy distribution and angles and the thickness?

MR. ROLFES: Sure.

DR. MAURO: If you did, maybe --

MR. ROLFES: Well, here, I'll take you through how we would do a dose reconstruction. We would take information, reported dose from an individual's badge. The first dose conversion factors that we would use would come from our external implementation guidelines. It's a NIOSH project document which has a range of dose conversion factors. Typically, for an overestimate, we would use the highest document to dose conversion factor of that range.

DR. MAURO: You're not using Appendix B anymore. You're using the AP all the time.

MR. ROLFES: We typically would use the highest dose conversion factor for ^.

DR. MAURO: Because I know there was a

problem with Appendix B. I know you were reworking that so for the time being until that's fixed you go with AP all the time.

MR. ROLFES: And then, additionally, we would also look at any additional information within the site profile as well for Nevada Test Site. And any additional correction factors that need to applied would also be applied on top of our basic dose conversion factors from the implementation guidelines.

DR. MAURO: So I have one MR, let's say I have a change-out period. I get 100 millirem over the course of the month. And that would be, let's say you're ^ ten millimeter depth dose, essentially a whole body dose. You get that report back, it's a 100 millirem in that period. Then you have an adjustment factor to AP.

Let's say it's a dose to the lung. You have some, you look up the geometry in Appendix B of OCAS IG-01, and let's say it's 0.7. That's probably what it is. And so now you've got instead of 100 millirem, you've got 70. But beside that there are more adjustment factors that we're saying have to do with the

fact that the radiation wasn't normal. It was something else. You don't know what it was. For this particular worker for all we know he could have been inside a tunnel where a large fraction may have been far from normal.

I guess all I'm asking is do you have a sense, are you confident that that's accommodated in your adjustment factors? The fact that it might be far from normal for some protracted period of time, especially if he spent most of his time in the tunnels for a given year or a given assignment at the site. And you're saying that you feel confident that --

MR. ROLFES: I'm confident that the dose that we assign in a dose reconstruction is typically, even when we do a best estimate claim, it's typically a dose that is higher than what the individual actually received through the organ of concern.

MR. ROLLINS: If I may, this issue I remember, the impression that I had and the discussions that I had with Richard Griffon who did the work, was that you were interested in people that -- when you say environmental,

I have this picture of somebody walking across the desert floor. When they're in a tunnel, I don't necessarily consider that environmental. I consider that workplace exposure.

So, and then you mentioned the Mallinckrodt which I haven't read that document. It's my understanding that was a small source that people were working on top of as opposed to a point source or a common source ^ such as a pipe-fitter who's working on hot pipes. And when we get in those situations, we do case-by-case geometry factor adjustments. And I've done one myself where this man was working on pipes. And we had provisions that would then how we do dose reconstructions to make those adjustments where we understand what the geometry of exposure was, and that would be totally appropriate. But for somebody standing on top of a small source that was reading two R per hour at chest level, and we can document that, and he's got testicular cancer, then clearly some type of geometry adjustment needs to be made.

DR. MAURO: One of our concerns that goes to

^ our response ^ three areas we broke this up into: the energy distribution, the angle of incidence and also understanding the job responsibilities. I think the first area is sort of well developed and it's almost like conventional standard to understand the energy distribution. And once you understand the energy distribution and the shielding, I think you can make a demonstration if the energy is normal ^, you've got the situation under control.

This confounding between the second and the third, not really fully understanding what the setting was that this person has, our experience is going to look at this. We really don't know what the person is doing especially in the early years when he could have had multiple responsibilities. So one of our concerns is --

MR. ROLLINS: Or do we even know where the radiation source is coming from?

DR. MAURO: Exactly.

MR. ROLLINS: Is it coming from the walls, the ceiling or only the floor?

DR. MAURO: So what I'm thinking is if I was

doing the dose reconstruction, and I have some records of a worker, and I'm not quite sure all the various things he's done, he may have a job title, but there may have been a lot of different things where his setting in regard to energy distribution ^.

MR. ROLLINS: All isotropic.

DR. MAURO: It's isotropic. Now what I'm hearing is that you believe that urinalysis shows that you covered ^. I thought you were going to be using a multiplier of one. In other words not get that 0.7 here. I thought you were going to go to the one. That really covers a lot of ills. You said you're not doing that.

MR. ROLFES: We typically use, when we complete a dose reconstruction for an overestimated claim, we typically default to a dose conversion factor of one.

DR. MAKHIJANI: But not in a best estimate.

MR. ROLFES: For a best estimate we would consider the details of the workplace and use actual dose conversion factors for, and we typically would use, still we would use the highest documented range of dose conversion

factors for that given of organ and energy distribution.

DR. MAURO: I walk away with you saying --

MR. ELLIOTT: And type of dose because you've got environmental dose.

MR. ROLFES: Yes.

DR. MAURO: So when you're talking environmental, you're not talking inside the ^, you're talking ^.

MR. ROLLINS: That was not my thought when this issue first arose. What you're alluding to is the workplace exposure to high levels of radiation which I don't consider that environmental. I mean, it's probably just semantics.

DR. MAURO: ^.

MR. ROLLINS: It's semantics.

DR. MAKHIJANI: I think Gene might be right about that.

DR. MAURO: Because I could envision if it's an infinite plane instead of this ^. ^ what the angle of incidence would be, and then make a judgment given that setting and understanding that the shielding, you probably got a handle on it. And I'm not saying that,

you know, it’s not, my guess is that you’ve got a handle on it. And, of course, you have to make assumptions that would give the benefit of the doubt, but I think it’s tractable.

What I’m getting at is now whether or not ^, I would be the first to admit that, yes, if you have a handle on ^ surface roughness, where you have some sense of the age of the fallout so you have a good sense of the energy distribution that we’re dealing with and also understand how the film badge was designed and calibrated, you’ve got a tractable problem. Of course, that all of a sudden becomes a research project.

DR. MAKHIJANI: But Lynn had actually raised some issues along the lines earlier so maybe we might defer to him on that.

DR. ANSPAUGH: Well, I would like to make a few comments. The nature, of course, there are no infinite planes, and we use that as approximation because it makes the calculation so much easier, but in reality it does make a difference.

And if you’ve been to the Nevada Test

Site, and you've seen the desert pavement, you know that that's not an infinite plane. And there is certainly is some change in the angular distribution and also energy distribution. It makes some difference for gamma. It makes a great deal of difference for beta, of course, because there's a great deal of shielding. And I think Mr. Griffith did note that in his write up where he suggested that perhaps Beck's calculations with an exponentially distributed source were more appropriate.

And I might also comment that there are no infinite depth distributions in nature either, that the rainfall out at Nevada Test Site is pretty sparse. And we've done some measurements looking at the distribution of activity with depth over 30 or 40 years afterwards, and it's still all very much up at the surface, within the first few centimeters or so.

So I think this is a serious computational problem that hasn't been solved exactly, and it's probably a case where you need to make some kind of a bounding

calculation for your purposes. But I think it's a serious issue to assume that everything is AP geometry.

I believe there are two situations where we had high exposures at the Test Site. One was people going into a very widely disbursed field to retrieve samples in which case the exposure would have been isotropic. And then in the tunnels, and I don't know whether it's occupational or environmental or what it is, but the main tunnel did get contaminated.

And I'm sure Billy can tell you much better than I can. But those tunnels did get contaminated because they were used for many different shots, and sometimes the events took place and those tunnels did get contaminated. And so you had a very complex exposure situation where AP geometry, I would guess, would not be appropriate at all.

DR. NETON: I think we could focus the issue on ^. I mean we have occupational exposure and environmental. I think there's a big difference here in how we approach both of those --

MR. ZLOTNICKI (by Telephone): Excuse me. I can't hear anything being said at the moment.

DR. NETON: I would like to focus this on the two issues we're talking about. One is environmental, and one is occupational. The environmental exposures I believe are, as Mark has characterized, fairly low.

Now we could argue about what's low, but you speak about these imperfections and assumptions that are made that don't, maybe are not exact, but I think there's a, levels are still fairly low and it's a tractable problem, I think. We can make some modifying assumptions and bound it pretty well.

When you start getting into the, what I consider the true occupational high-source exposures as tunnels and as hot spots as Arjun mentioned, I think that we would model those specifically for the different exposure scenarios that exist. That's a very different issue. You can come up with all kinds of different models to account for that which we have in the past as Arjun alluded to, with Mallinckrodt, with surfaces and hot spots and gloveboxes and all those sort of things.

So I think we need to separate those two issues and not ram in between them because they're two very different problems to be addressed with different solutions.

DR. MAURO: It wasn't until this conversation that I was aware that we were talking environmental. We didn't have a distinction between a simple setting of uniform ^, but surface rock^ was certainly in play there. It sounds like you folks have taken that into consideration given your energy distribution ^. You didn't go through the calculations to see if you come up with the same correction values. But you don't have correction values on the ^. Right now whatever the ^ factor is in ^ or AP, that's it.

MR. ROLFES: In the implementation guidelines there's a range of dose conversion factors which will incorporate and there were incidents.

MR. CLAWSON: This is Brad. I heard you mention when you were dealing with environmental and ^ throughout the site and such like that that you were looking at their

job titles. I want to clarify on that because this has been a very difficult issue for me personally to be able to get a hold of because in the earlier years so many people did so much different things. And as they recall a lot of it dropped off into the one. That's far more to make sure we're looking at this in the right way.

MR. ROLFES: That would not typically be the first piece of information we would look at. The first piece of information for a dose reconstruction would be the individual's dosimetry records. Then we might consider, well, what did this individual do? We'll typically take a look at the dosimetry data that we receive from the, for this specific individual ^. And we would use that ^ first. If there were periods, for example, when we need additional information. We would take a look into the individual's job titles, the areas that he worked in, went into. But job titles alone would not necessarily be used as the first piece of information. It would be the dosimetry records.

MR. CLAWSON: The reason I brought this up

is because we've heard many times ^ .

MR. ROLFES: Yes, and the dosimetry, the dosimeters would have been with those individuals across the Nevada Site. So it's that information that was captured by their dosimeter that we would use as the very first piece of information in reconstructing the dose.

DR. MAURO: One quick question. I'd have to go back to emphasizing ^ I wasn't aware the --

MR. ZLOTNICKI (by Telephone): Excuse me. I'm sorry. I don't know what's going on, but really, it's very hard to hear anything being said at the moment.

DR. MAURO: Joe, can you hear me? This is John.

MR. ZLOTNICKI (by Telephone): Yes, I can, but a couple of people speaking lately, I cannot hear anything.

DR. MAURO: ^. Right now what I'm hearing is that built into OCAS IG-001 beside the adjustment factor in Appendix B for AP geometry to go from some leaving on your film badge to some organ dose. There's also adjustment factors in there and take into

consideration the angle of incidence. And from what ^, in our response we provided some tables, tables that came from Hine and Brownell. Now, there were some pretty big adjustment factors. If all the exposure was at a ^ and was a low energy, we'd really be off. But we realize that's not going to be the case all the time.

So built into your methodology for infinite, or effectively infinite plane, what kind of adjustment factor are we talking about, a factor of two? In other words after you come up with your ^ dose, you multiply by 0.7 and get the organ dose. Now you want to throw in another factor and take into consideration, wait a minute, it wasn't normal; it was off normal. You're saying that there is an adjustment factor. ^.

MR. ROLFES: Once again I think you're confusing occupational exposure with environmental exposure.

DR. MAURO: I'm talking about ^. Now, in the environment we're not normal where to a large extent ^.

MR. ROLFES: If you take a look at more than

one million dosimeters that were processed at the Nevada Test Site, I believe more than 99 percent of them had no recorded dose on them indicating that the external exposures from environmental contamination for 99 percent of those dosimeters and people who wore them were zero.

DR. MAURO: I can argue that's because the energy distribution is very low, and it was at an angle. And that's why you see an awful lot of -- I'm not trying to be a wise guy. I'm saying that there is an analysis that could be done. And if you did it, great.

The analysis being given this mix of radionuclides and there is a distribution of mixes for different age radionuclides sitting on an effectively infinite plane with surface roughness, and given that in, let's say, a number of different places, you could demonstrate what you would expect the missed dose might be. And you may have done the calculations and they show that really it's not very much. If ^.

MR. ROLFES: Rather than do the calculations, we're already incorporating a

claimant favorable missed dose for every non-positive dosimeter in the cycle. So we're already assigning if the individual wore a badge onsite and didn't receive any recorded dose, we're already --

DR. MAURO: You give him points.

MR. ROLFES: -- we're already assigning half of the limit of detection for each non-positive --

DR. MAURO: So you're saying that we received no positive reading on this change-out. We've already given this person 20 millirem and that would be to the badge and then, of course, the adjustment factor. Now, of course, built into that is the assumption that if there was some angle of incidence, it doesn't really matter. You see, I'm concerned --

MR. ROLFES: We're taking a result of zero, and we'd be multiplying the correction factor times zero essentially. Instead of doing that --

DR. MAURO: I'll tell you. If I were doing this calculation, I would say, I would start off with the mix, ^ age for the fallout, and

say is it possible for me to miss a dose that's significant. And what I'm hearing is it's unrealistic. We could make an argument that says, listen, we didn't see anything so therefore, there isn't going to be much out there. From looking at some of these calculations, low energy and high end ^ incidents, you could have a pretty high exposure and miss it. And if I'm wrong, I'm wrong.

MR. ROLFES: But not from an environmental exposure.

MR. CLAWSON: ^ workplace ^ environmental ^.

DR. MAKHIJANI: We're not doing these correction factors for workers' exposures, are we?

MR. ROLFES: That wasn't the issue.

DR. MAKHIJANI: Yeah, no, that wasn't the issue, but this, since it has come up, I'm just asking ^ information.

MR. ROLFES: It certainly can be done, and based on information for specific tests as documented in the Rad Safe reports for various events, we can apply those on a case-by-case basis. And we do that, in fact, in dose

reconstruction.

MR. CLAWSON: ^.

MR. ROLFES: It's dependent on the time period and the radiation exposure potential for the worker.

MR. CHEW: ^.

MR. ROLFES: Yeah, exactly. And for example, if an individual did go into a radiation area and received a significant ^ as indicated by his ^ process.

MR. CLAWSON: Well, I was just trying to get a feeling for environmental if a person had their ^ values showed up zero ^.

MR. ROLFES: Yeah, exactly.

MR. SCHOFIELD: It seems like sometime back you were, you mentioned that personnel who worked for Los Alamos National Labs, their dosimetry was kept separate. Was that a misunderstanding on my part?

MR. ROLFES: Everybody that entered Nevada Test Site received a Nevada Test Site badge.

MR. SCHOFIELD: Okay, that's what I was just going to ask. If they did have separate, how'd their data compare with those people who had a Nevada Test Site badge?

MR. PRESLEY: We used to take our badges up when we entered, put the badge on the wall or whatever. They knew you were onsite when you picked up your badge.

MR. SCHOFIELD: Okay.

MR. FUNK: ^All the DoD people got their own badge.

MR. PRESLEY: DoD, I'm sorry. You're right. Yeah, DoD, the Department of Defense did. They had their own badge.

MR. FUNK: Some of the DOE ^ maybe GE and Rockwell.

MR. ROLFES: That's a good point. There are some individuals as well from --

MR. FUNK: ^.

MR. ROLFES: Sure, there are some occurrences where they also would have received a Nevada Test Site badge however. So it is possible that when we would receive a claim for dose reconstruction --

MR. FUNK: ^ J-Core^.

MR. ROLFES: -- we might receive a dosimetry response from another laboratory, for example, from Oak Ridge National Laboratory. Typically, some of the people that entered

Nevada Test Site to work on tests were monitored both by Oak Ridge National Laboratory as well as by Nevada Test Site.

DR. MAURO: But you know it's, I think it's a simple question of what you're effectively saying is here we have a worker that has zeros every month for a year and then we'll assign 240 millirem. You're saying that that sounds pretty good. Is it possible though that he could have gotten more than 240 millirem because of the energy distribution ^? And you're saying no.

MR. ROLFES: Correct, in all probability that's very ^.

DR. MAURO: And you feel that way because you've done the analysis or, to me, I think it's a tractable question that you feel confident. Right now I have to say I do not have an intuitive feeling that that's the case. But it may very well be the case.

MR. ROLFES: I have no indication that an individual or any individuals would have received -- no, I certainly feel that what we are assigning is claimant favorable. And that's just based on records that I've seen

and survey data from the site. I don't have all of that with me. We can certainly describe that, but the entire site was set up with a system of monitors and radiation levels on the site were monitored continuously.

MR. ZLOTNICKI (by Telephone): John, can I jump in a bit because I think, I'm inclined to agree that it would be hard to imagine that a badge gets zero when someone's walking around, whether it's in a tunnel or outdoors and consistently manages to get a significant dose that shows up as zero. I think that would be hard to believe that that happening.

I'm more concerned about a different problem, and that is a few people that I think sometimes there's a tendency to say, look, we had a million badges. Most people got nothing. I'm not worried about most people. I'm worried about anyone because they're all individuals. And even if only one percent had a dose, I worry that we might grossly underreport that dose because the badge didn't respond correctly to the radiation that was coming from the ground or the ceiling or wherever.

And that is not being addressed by saying, well, we're giving 20 millirem to give the claimant the benefit of the doubt. I'm talking about the person whose badge reported 300 millirem but should really have been 6,000. And that's being thrown out in this discussion.

MR. ROLFES: Once again that's a separate issue. We're referring to environmental exposures, not occupational exposures in high radiation areas.

MR. ZLOTNICKI (by Telephone): Are you suggesting that over the 30 or 40 years no one ever got 300 millirem on a badge from an environmental exposure that wasn't part of their occupation? I mean, surely, I mean, we know Baneberry event where people got many hundreds of millirem. I mean, there must have been events where people got exposure to their badge that wasn't directly attributable to their job per se. In other words they just happened upon contamination or whatever. Surely that happened.

MR. ROLFES: An incident such as that would be considered an occupational exposure rather

than an environmental.

MR. ZLOTNICKI (by Telephone): Well, again, I think --

MR. ROLFES: -- in environmental we're referring to just the ambient background that existed continuously on the site.

MR. ZLOTNICKI (by Telephone): Well, I'm sorry. I mean, I'm not being glib here, but where does environmental exposure stop and an incident or an event start? There has to be a continuum there.

MR. ROLFES: Baneberry was an exceptional incident that was not characteristic of the normal background at the site. It was an incident, and it would be treated as such. It is an exception to the norm.

MR. ZLOTNICKI (by Telephone): Well, I agree. That's a documented event, and I'm just suggesting there are other events some of which were documented and some presumably were missed. I'm only suggesting if someone had a dose on their badge, we can't assume because it said 300 millirem or whatever other number it was that that was indeed the dose when it was perhaps an isotropic exposure to the

badge. That's all I'm saying.

MR. CLAWSON: One question ^. I know that my --

MR. ZLOTNICKI (by Telephone): I'm sorry. I can't hear the response.

MR. CLAWSON: This is Brad. One of the things that bothers me is that like our site, they take off, they have a correction factor for our badges. They take off ^. And they take off of our badge each month, and they say ^. Do we know if this was done ^. They took ^.

MR. ROLFES: Well, right now everyone in this room and everyone in the world is being exposed to radiation. There's a natural, you know, a naturally occurring amount of radiation.

MR. CLAWSON: Right.

MR. ROLLINS: What we have been able to document was the control badges kept in low background areas, no one can ever remember a case where the control badges showed up with any significant dose on them so there was nothing to subtract. In other words there was no measurable means. That's all I'm saying.

MR. SMITH: This is Billy, Billy Smith. The dosimetry process when we process dosimeters every month, we had in the batch two controls and five standards. The controls were dosimeters that were kept in a low background cave. The five standards were dosimeters that were exposed to ranges of radiation from about 30 MR to about 1,000 MR in a controlled atmosphere. The standards were controlled by exposing them at the calibration facility to ranges of 30 MR to 1,000 MR.

So we had five badges over that range. And the two controls we put in the cave, they represented the background exposure. So when the batch was processed, all of the badges in that particular batch were processed with the two controls and five standards.

So any optical density that was measured on any badge that had a dose on it, you would then relate that to whatever background dose that you may have had from the two controls. We also took the five standards to make sure that we knew what the calibration was for that particular badge. So you knew what the response would be for badges in that

particular batch in terms of ^.

DR. ANSPAUGH: Could you describe this cave and exactly where it was located? Was it in Mercury?

MR. SMITH: Yes.

DR. ANSPAUGH: Was it made out of lead or something like that?

MR. SMITH: Yes.

MR. SCHOFIELD: Because environmental dose, you're assuming the largely short-lived isotopes have already decayed out and you're calculating environmental dose.

MS. MUNN: You're not calculating the environmental dose. They're taking it from the badge readings.

MR. SCHOFIELD: Right, but they're going to assume that any environmental dose they get, those will not be a factor in --

MS. MUNN: Well, you don't have to assume if you have a badge reading.

MR. ROLFES: ^ record any dose that the individual no matter what ^ exposed the badge it would be documented within that badge. So, yes, it would be measured. Any short-lived fission products or long-lived fission

products would be measured by the badge.

MR. SCHOFIELD: And they would all ^.

MS. MUNN: Are we okay with environmental?

DR. MAKHIJANI: There's still some residual discomfort with this idea that John has raised, you know, that we need some idea of a little bit of a review of the rates of environmental dose ^. Well, the point was also raised by Joe that you don't have environmental ^ in those cases where you ^ where you're missing a significant dose because of the ^ been exposed. But for most of the issue I think, for most of the cases ^. I'm not the expert on the subject. I should let the people who -- but that's what I'm hearing.

MS. MUNN: I'm still concerned about the definitions here and whether, when Joe's talking about his concerns, whether we were very clear about environmental as opposed to occupational.

DR. MAKHIJANI: I don't know that we sorted out, is there a definition somewhere that NIOSH -- you do different chapters on occupational and environmental. Normally,

environmental is just stack emissions and things like that. I don't know in this case whether it would be different.

MR. ROLLINS: This is Gene Rollins. I did the chapter four for NTS, and I also did a similar chapter for Savannah River Site. And what I tried to capture in that chapter was what I would consider ambient background that's unaffected by the activities, the ongoing activities, at the facility. That's how I would define it, and that's how I tried to define it in my chapter.

DR. MAKHIJANI: Well, how do you cover previous tests? I mean, this is Nevada Test Site --

MR. ROLLINS: That's what I would be measuring. That would be residual in the soil. And presumably the ionization chambers measurements out there would capture that. And there were a lot of ionization chamber measurements out there. And that's what I tried to capture in the document. And there is a section in there that actually shows those measurements.

DR. MAURO: Well, I'm sorry. So you're

saying the revision, one of the ways you have to validate that approach is you have an ionization chamber, which is ^. So and you're saying that when you make that reading you get a certain MR per hour --

MR. ROLLINS: That might go up.

DR. MAURO: -- that might go up ^, and then when you link that back to what the film badges were reading, there's parity.

MR. ROLLINS: For your information, the measurements in chapter four in '77 through '93, they average about 90,000 millirem per year, and that's for 8,600 hours. So if you relate that to a badge that someone might be wearing, and if they come off quarterly or monthly, you're not going to see it.

DR. MAKHIJANI: ^ and 63 in '60s. Do you have measurements for the '60s?

MR. ROLLINS: I could not locate them. Back in the '60s it seemed to me, and Billy, you can help me out on this. But it seemed to me they were more interested in measuring the effects of the weapons testing as opposed to trying to determine what the ambient background was. And I read through these

reports and tried to find out what their mindset was. In the early days they wanted to measure the contamination in the plume, for example. They wanted to measure the contamination from the fallout that was the result of a particular test. Which those are the areas that people would not be allowed to go in unless they were monitored and closely taken care of. What I was trying to capture in chapter four were the areas where people could go without radiological control.

DR. MAURO: And you're seeing exposure rates in ^ per hour which are lower than the 120 millirems per year you ^.

MR. ROLLINS: Right, typically.

DR. MAKHIJANI: Well, but you only have measurements from ^ and that the problem events were not in the 70s. It wasn't in my mind that they were talking about '77 to '92.

MR. ROLLINS: But the areas that were affected by these incidents were documented.

DR. MAKHIJANI: Well, how well are these incidents documented in terms of environmental exposure? I guess we would have to have more details than I certainly studied.

MR. SMITH: This is Billy again. The Test Site was monitored on a 24 hour/seven day a week basis by Rand from ionization chambers that operated 24 hours a day and read their signal back to a recording device. And those recordings are documented, and all of the environmental reports ^. Not only were there environmental rams out there, but there were event rams located around the surface of ground zero on LNS shots, vertical shaft shots.

There were rams units located in the tunnels at various distances starting at the portal all the way back to several hundred feet within the working point. And these were telemetered back to the CP at the other locations that people could look at to determine whether or not it was safe for people to go into work. But in terms of the environmental exposures, the environmental rams were there and operating seven days a week/24 hours a day that gave what the exposure rates were at many, many locations on the site. And you can count the locations in the environmental ^.

DR. MAKHIJANI: Even in the ‘60s?

MR. SMITH: I started in 1966, and they were there.

DR. MAKHIJANI: I heard you say that you only got measurements from ’77 on, but now I’m hearing that you have measurements going back into the ‘60s which would be more reassuring.

MR. SCHOFIELD: From your opinion do you feel comfortable, this 120 a year millirem that they would give a person as environmental dose?

MR. SMITH: Personally, I would.

MR. SCHOFIELD: That’s what I wanted to know, thanks.

MR. PRESLEY: Anything else?

(no response)

MR. PRESLEY: Everybody okay?

DR. MAURO: If Joe or Lynn feel -- let’s see if I can make sure we’re okay. You made a bulletproof argument that the survey you used ^ across the board when an area’s which were close to ^ because I guess we don’t even know the rem per year, right? So you’re in the background.

MR. ROLLINS: It varied at locations.

DR. MAURO: You were in the realm of background. And people who were wearing film badges at that time were getting ^ so you need to respect that. And that works. Now by extrapolation let's say we were in the area that got less, 200 maybe. You have the survey, and in general this area, a person was working here for a year, he would expect ^ value based on using a hand-held survey instrument. What I'm hearing you saying is that a hand-held survey instrument is, you know, you kept listening and everybody took some readings ^. And you had people working there day after day after day. At the end of the year you say what kind of doses --

MR. ROLLINS: Keep in mind this was 8,600 hours. This is for 24 ^.

DR. MAURO: Yeah, I'm moving now out of the background realm ^ not high, you know two, three hundred millirem a year that were therefore clearly above background. They were, in fact, detected with your survey instruments and coming in at a rate that seems to be ^ film badge readings. Some workers got left in that area that you ^ which you should

be getting some positive readings ^. But what should happen is there should be some parity ^.

And in my mind that would just be, put this thing to bed once and for all. That is whatever the angle of incidence ^ theoretically, we could argue, well, there could be a problem here, but if you're telling me that you're certain there's parity between the survey meter readings and the film badge readings, that sort of just shows that, no, if there are differences, they're not that large. And that's what I'm doing ^. If you're saying that's the case, I think then this ^ to bed.

DR. MAKHIJANI: Gene, do we have, if you could just, between you and Billy, I think I do not understand that you've seen the report that Billy talked about.

MR. ROLLINS: Arjun, but I wrote this document ^ I used readily available information --

DR. MAKHIJANI: Right.

MR. ROLLINS: -- this was all presented in the environmental reports, and the environmental reports did not have a detailed

breakdown of the ionization chamber reading until starting somewhat later, like about ’77. There probably are other data out there that we could pull in, but about the time that we decided maybe we should go look for that, then because of this control badge information that we learned where nothing was ever subtracted from the badges, we stopped assigning environmental dose altogether because of this collective, we felt like it’s collected and probably accounted for on the personal dosimeter.

So we did not do any further research into those earlier years because of that. But it seems to me that from ’77 on the badge parity and the ionization chamber parity, would it be reasonable to assume that that parity existed also, or would we need to go back and prove that?

DR. MAURO: ^. I said, well, in theory ^. In other words realizing that did not come in ^ time ^. In fact, a factor of two is enough for me to start ^. And not because of background. I agree with you. If a guy’s in a background area, and generally there’s a

background area, you're assigning 120 millirem to ^. Yeah, that would be claimant favorable.

But if he's not in a background area, is it possible that you could be underestimating his dose by a factor of two because ^ energy distribution. ^ you folks are confident that that's not happening, and you understand the reasons why I ask that question, and I haven't done all the analysis you folks have done.

If you walk away with that sense, I guess, are we going to check those, I mean, in theory, we can go back and run all sorts of MCNP calculations and different age-rated radionuclides, different surface rock ^ and also ^ and then you walk away and say ^. Or maybe we walk away and say maybe we're off by a factor of two. I have a funny feeling I'd walk away saying we might be off by a factor of two. That's only my intuition from looking at those curves.

MR. ROLLINS: So what I'm hearing from you, John, is that what we told you from an environmental point of view, and that is ^ find an environment that's not known to be

affected by ongoing facility operations. Now taking into account previous atmospheric tests did deposit on the desert floor contamination.

But it’s not to such a degree that it has to be, have radiological control, radiation work permits to go work in those areas because it was basically unmeasurable other than by heroic activity. So that’s how I define environmental. And you’re okay with how we’re handling environmental?

DR. MAURO: Yes, when you’re basically a backup. ^ just a zero. If he only worked in an area that wasn’t contaminated and you’re assigning him this 20 millirem ^ change-over, of course that’s ^.

I’m more concerned about the person that’s in the -- now see, there’s the environmental dose -- in any area that he works for a protracted period of time where there’s always residual activity, you know, chronic exposure, which is above maybe 200 millirem. That scenario, you say that doesn’t occur.

But let’s say the person is in the environment where’s he’s getting, and his

badge is reading ^ 300 millirem. That's what his badge read. I could see based on the geometry of exposure and uncertainties regarding the geometry exposure, and uncertainties about the energy distribution that he might have been exposed to, that you might have underestimated his dose by a factor of two.

MR. ROLLINS: Which may be 100 millirem, 200 millirem?

DR. MAURO: Two hundred millirem. So in other words there are two, three hundred millirem ^. Is that important?

MR. CHEW: It's also assuming ^ where the angle of incidence has been described for this issue here. ^ saying that he's either standing up or--

DR. MAURO: But it's not normal. I mean, see, normal is --

MR. CHEW: He isn't doing that. He's also sitting down. He could be laying down. That neutralizes that ^ angle of incidence ^.

MR. ROLFES: The individual would be continuously moving in the radiation environment and not standing still so ^ only

be exposed from one angle is not realistic.

DR. MAURO: I would agree with that, but I'm saying remember the calibration is always normal. Once you're off normal, you've got a problem.

MR. ROLLINS: Well, John, we had agreed --

DR. MAURO: How big it is I don't know. It depends on the energy distribution and how far from normal you are.

MR. ROLLINS: And the size of the source.

DR. MAURO: Well, that affects the normality.

MR. ROLLINS: Right, so if we're in a slightly elevated background area, is that likely to be a, not infinite, but a large source or a highly concentrated source? And if it's highly concentrated, how long will you be able to stand on top of it as opposed to standing over here or standing over there?

DR. MAURO: I'd be the first to admit that ^. I guess what I'm saying for all intents and purposes the badge experience is something that's awful close to normal.

MR. ZLOTNICKI (by Telephone): Can you repeat that, John. I'm sorry. Again, I'm

having a hard time hearing anything here.

DR. MAURO: I'm sorry. Joe, what I'm hearing is for all intents and purposes, the angle of incidence in an environmental setting is not that far from normal. It's not until you're really well off normal where you stop and get some serious need for adjustment factors, and, of course, when the energy is low.

What I'm hearing is that for all intents and purposes the nature of the photons impinging on the face of the detector it really is not that far off from normal so the calibration works. If everyone agrees with that, in fact, it's probably not all that unreasonable --

MR. ZLOTNICKI (by Telephone): I don't know how it can be, environmental dose can be normal. I mean, only a small component is going to be normal.

DR. MAKHIJANI: Mr. Presley, I don't think there are big differences here if we separate the occupational dose as Jim Neton was suggesting from the environmental dose and maybe in principle there doesn't seem to be a

huge issue.

We could sort this out on a small technical team basis so that we don't have any loose ends hanging there, and this doesn't resurface. It might be good because in a very big group, I'm uncomfortable, this is a very detailed technical discussion that has a lot of numbers underlying it. And I'm very uncomfortable in settling such complex issues in a big group discussion like this.

MR. CHEW: Gene, do you agree with that?

DR. MAURO: I think that's where we are. We're in the TBD. I mean, we're not talking the SEC section. We're talking TBD.

MR. CLAWSON: ^ agree with Arjun. The Nevada Test Site is a very unique site in the sense of ^ environment and everything that's going on out there. I agree --

DR. WADE: Mark, are you comfortable with a technical call then to try and resolve this issue?

MR. ROLFES: I guess so, yes.

DR. MAKHIJANI: Maybe we might present it a little bit more sharply than what we have done.

MS. MUNN: That would be my request. Could you please define exactly what it is you're going to resolve here because we started off with one set of what I thought was issues, and we've now evolved into what I believe is a different single point to be clarified. So if someone would be good enough to state very clearly what it is that this technical team was going to resolve, it would be helpful for many of us.

MR. ROLFES: Thank you, yes. This issue, number 11 on the matrix has been marked closed on more than one occasion, and it keeps coming back.

DR. MAKHIJANI: I mean, there've been various definitions of closed here. So I'm not sure what closed means. We've never responded until now to your, the paragraph that you wrote in the matrix so far as I'm aware. This is the first time we've actually presented you with our view of your response.

MS. MUNN: May I articulate what I think we're asking you to resolve? I think you're being asked to resolve the angle of incidence issue for badges in occupational settings. Is

that correct? In environmental settings, not occupational settings.

MR. ROLLINS: What you said I think is correct. But then we have to define what is environmental and what is occupational.

MS. MUNN: So you have two issues in front of you. One, defining the line between the two, and two, the angle of incidence issue with respect to environmental exposures, right? Is that what we're being asked to develop?

MR. ROLLINS: I think that's right.

MR. ROLFES: Within the site profile we do have documents, I'd like to reiterate, that we do have a section in there, 6.4.1.6, which incorporate correction factors for an external environmental dose. Did complete calculations in 2006 that showed correction factors for external exposure environmental radiation based on the Nevada Test Site.

MR. ZLOTNICKI (by Telephone): But am I correct in thinking those are for idealized doses and don't take account of the dosimeter, just saying if the organ is exposed from the ground or the ceiling or whatever, what would

the correction factor be compared with an idealized measured dose AP? I don't think those correction factors that deal with specific dosimeters and their response to isotropic or any other form of angular exposure.

MR. ROLLINS: Are your comments couched, based on your review of ^ 2006?

MS. MUNN: Did I just hear occupational exposure creeping in here again instead of environmental?

DR. MAKHIJANI: Part of the confusion that arose and the reason I didn't actually initially respond to this when we presented you with a larger document is this is labeled occupational environmental dose. But the section was written up in the occupational/external dose chapter six of the TBD. And so there are two different things that got mixed up in the original NIOSH document, and that is the source of a lot of this confusion.

Initially, we actually did not respond to this particular item because it was labeled environmental dose, and that we reviewed that

as part of your chapter four and that had not been authorized. But then it was pointed out that it had been written up in chapter six, so we were asked to respond to it. And so that's how it got responded separately from everything else that had to do with external dose because of the mix up of terminology in the NIOSH document initially.

MR. PRESLEY: What I have, your ^ states correction factors for external environmental dose due to geometry of organ-related relative to badge of angular dependency.

DR. NETON: I think that's the issue is environmental dose and how adequately a badge on the interior torso reflects the exposure to the various organs from environmental deposition of radioactive materials.

DR. MAURO: And in our opinion it's a very tractable question and so it does not bear on SEC issues. It bears solely on ^ a factor of two --

DR. NETON: What type of correction, if any, is applicable, and we need to have this technical discussion to document what type of correction factor may be involved.

DR. MAURO: I think it's as simple as that. Right now I'm sitting here saying if I were doing this, would I need another factor of two here to account for this or are we okay the way we are.

DR. NETON: I also think though some of the discussion that Gene Rollins brought up relevant to bring to the table which is what were the ambient exposures at the site as measured by these ionization chambers. I mean, it's sort of a story to flesh out here.

DR. MAURO: Yes, yes.

DR. MAKHIJANI: And what Mr. Smith brought up I think is very relevant also.

DR. NETON: I think we're not prepared to address all those issues at this table. So I think a phone call does make a lot of sense.

MR. PRESLEY: Now, as I see it then the issue for the site profile is closed. I think we've beat that to death. And you all are going to go back with NIOSH/SC&A and talk about this technical point about correction factors for environmental external dose. Is that correct? Did I say that correctly?

DR. MAURO: Well, it is a site profile.

MR. PRESLEY: This is a site profile. The problem we've got with item 11 here is closed. What I just stated is as far as the site profile, this item's closed.

DR. WADE: What you're saying is closed with regard to an SEC issue but not a site profile issue.

DR. MAURO: It is open as a site profile issue.

MR. PRESLEY: Still has to work on as a TBD.

DR. MAURO: Yes, ^ site profile TBD.

MR. CLAWSON: And also, too, my guess ^ when we talk about actions closed, we've got a lot of them on here that, okay, NIOSH has said they're going to do this, so we'll close it, but still SC&A has responded to us of how it was implemented in the TBD ^.

So that's what I'm unclear on saying it's closed is because to me until it is closed is until our contractor says, yes, ^ implemented. We've come to an agreement on this, then it's closed. And that's what I'm getting confused on ^ being stated as closed. We need to make sure ^ the site profile the way that it should be and it was implemented

properly. To me that's when it's closed.

DR. WADE: And that's an issue for the work group. And there's a continuum here where you have an intellectual discussion. One side says I think this. The other side says I think that. They come to closure. They say we all agree with this. Now we're going to put that into the site profile. NIOSH goes ahead and does that.

The work group could decide that it wants its contractor to verify that. The work group could decide that it's comfortable that that's been done. The work group could decide that it's made the judgment that that's been done. It would vary all over the place depending upon the magnitude of the issue. That's for the work group to decide.

MR. PRESLEY: Let's take a ten-minute comfort break. We'll be back here at five minutes to nine.

DR. WADE: We're going to just mute the phone for ten minutes.

(Whereupon, the working group took a break from 8:45 p.m. until 8:55 p.m.)

DR. WADE: We're back into session. Robert,

what's issue number two?

MR. PRESLEY: Number two?

DR. WADE: You said we had two, two open issues. We beat one near to death.

MR. PRESLEY: Beat it to death.

Twelve we've resolved.

Thirteen we've resolved.

Fourteen we've resolved.

Sixteen's added to another issue. I mean 15.

Sixteen we resolved.

Seventeen resolved.

Eighteen has been resolved.

Nineteen has been resolved.

ITEM 20

And we're up to item 20. Now I've got this marked closed, and then we reopened it. And we need to talk about this for January the 7th. It has to do with internal non-use of the badges.

You want to kick this off?

MR. ROLFES: At the last working group meeting there were some, we believe that we had closed the --

MR. CHEW: ^ John at the meeting?

MR. ROLFES: Yeah, and we might want to ^ about tomorrow.

MR. CHEW: Yeah, John, ^ .

MR. ROLFES: At the ^ meeting we had agreed that this had been addressed, and we had provided several different methodologies to assign claimant favorable doses to individuals who potentially were not monitored at the Nevada Test Site. What we have now, we have opened this issue back up because of additional information.

We've received affidavits which Dr. Mauro has alluded to and briefly summarized. We did actually pull those affidavits up and looked at some of the data within the affidavits and also within the dosimetry records for the affiants. And we'd like to respond to this issue in a little bit more detail.

Quite a bit of time and effort was put into this on a very short notice. So anyway, I'd like to have Mel go ahead and ^.

MR. CHEW: Thank you, Mark.

I think I'm going to start and recognize that it's probably midnight for many

of you folks who came in from back east. Wanda, this is to our advantage this time because we're coming from the same time here.

MS. MUNN: I'm really sorry.

MR. CHEW: And I apologize, so let me try to keep it, ^ as I can so I will recognize the time ^.

I think I want to start by saying there was a very important discussion at the end of the December 19th meeting here. And actually I'm going to quote from Dr. Mauro here. Actually, one of the most important or issues ^ with the SEC. I recognize clearly this is not an SEC discussion at this time, but it is appropriate. And some of the discussions I'm going to have also will bear on some of the discussions we had earlier today.

DR. ROESSLER (by Telephone): Lew, this is Gen. Could he move closer to the microphone?

DR. WADE: We are working on that right now.

DR. ROESSLER (by Telephone): Thank you.

MR. ROLFES: We'll get that taken care of here.

MR. CHEW: Hi, Gen, can you hear me now?

This is Mel.

DR. ROESSLER (by Telephone): Oh, good, very much better.

MR. CHEW: Well thank you for allowing us to address this, what I consider an important issue here. I'm going to separate this discussion into three parts. The first part's going to take a little longer because it shows some of how we went down to explore one of the issues that were brought up. And the second one, and then that's the first issue is the affidavit from we will call Attachment Worker Number 12. As part of the SEC petition there was also an affidavit.

And secondly, is there evidence of a systemic pattern of people not wearing badges in a radiologically controlled area. This is probably ^. And thirdly, I'm just going to probably talk about ^ brought up by some of the other affidavits.

First, I would like to quote from ^. I gave you a little bit of warning, John, of a comment on December 19th during a working group conference call. Is that one worker -- and I have to look again. John, you probably ^

again. This may be another way to get a hook on this claim that he routinely left his badge behind but did wear the pocket ionization chamber, and then he was, in fact, he talked about a particular circumstance where his pocket ionization chamber read very high. I think it was five rem. I think that's what you said. And he left his badge behind.

So this seems to be one of the things I would want to do, of course as you well know, to see if there's any way to track this issue. And so here's what we were able to determine after a careful review of the records for that ^. From here on with respect to Attachment number Affidavit Number 12, I'm going to refer him hereafter as worker number 12.

His employment records show that worker number 12 started working at the Test Site on 11/1963, which was a good period because this is the time and the period where the badge and the film dosimetry was ^ separate badge. It was not an attached badge ^. It was then returned on 5/20/69, worked until 8/15/1978, a good nine years. He

returned in 1979 and worked until, he came in 1/30/1979, end of January, and worked until the end of April ’79. But then he again returned in late ’79 and more or less worked continuously until 4/30/2004. I just wanted to give you this person’s ^.

On one of the telephone interviews, a CATI dated May the 26th, 2004, he indicated that after working in E-Tunnel -- and this is where I pick this up with John -- after about ten minutes on 4/5/75, his estimated exposure was 5,000 millirem. This is what he stated in his CATI. On affidavit just about two years after, well, actually, almost two and a half years after, it was January 31st, 2007, worker number 12 made the following statement:

“In 1969 to 1974 I was mining in a tunnel. One time in 1968 in N or E tunnel we were sent in as a re-entry worker in order to wash down after a test.” ^ a very good memory ^. “We were supposed to read our dosimeters ourselves and get out when we reached a maximum of 5,000 MR on the pocket dosimeter.” If I remember correctly, our maximum for quarter of the year was 5,001. I think I got

that in some record. ^ I understand you understand that. He ^. "I reached 5,000 MR in about five minutes while working in that tunnel. NIOSH has only my dose for the whole year of 0.5375." That's after ^.

Continuing, worker number 12, as a subsequent affidavit dated February the 5th, he describes pretty much the same thing again. He described how he and his coworker did not wear film badges that they were issued when they were on the job site. Because management discouraged dirty or misplaced badges. He further explained that when badges were worn, they were either placed in a pocket or ^.

He described one incident again -- this incident was in E Tunnel -- in which workers were sent into the tunnel after a shot to wash out or wash down and were instructed to get out of the tunnel when the badge reached 5,000 MR. ^. It's important. ^ for this time period we reviewed to see the information available to them.

I want to describe one thing to start talking about the wearing of dosimeters in access and egresses in radiologically

controlled areas, especially tunnels at the Nevada Test Site. And I think it's an important point. I'm going to show a picture of a RAD-controlled point. I brought some pictures, and Wanda, I think you always said you always like pictures.

MS. MUNN: I always like that, yeah.

MR. CHEW: Where this is a, it's actually a picture of a RAD-control point in a tunnel, in a tunnel. So you can see this, I'm just going to hold it up. This happens to be the radiation technician here, and he, she, it turns out this lady, is now logging in or logging out, for instance, the location of these people in the tunnel. This is an important point.

It is important to note that these are in what you would call radiologically-controlled areas -- that's a real good term -- which is a radiation area. There's a control access point where an individual signs an access registry and given the pocket dosimeter, a pocket dosimeter or an ion chamber. I happen to have brought some ion chambers, so we remember what they looked

like. One is a 200 MR pocket ion chamber, and one is 1 R, ionization chamber. I'll come back to why these are important.

These pix dosimeters were worn at the same time and pocket dosimeters were used, pocket dosimeters are self-reading, meaning that the individuals could look in the scale of the dosimetry at the time. Here's what happened. Let me describe it to you ^.

A person comes up. He is now going into the tunnel. What is there is that in order for him to acquire an access, they have to go pass through an access-control log. This is what that lady is holding in her hand. They have to pass this particular log. What is in the log here? Well, I'm going to read this information from the badge and from this daily log that he has. He's given a daily log. You're coming in. He will know how much radiation you have received up to that particular day. So I'm going to --

DR. MAURO: Of course, up to the day based on his film badge.

MR. CHEW: On his film badge, not his pocket dosimeter, his film badge. The last time they

processed the film badge.

The Radiation Safety staff validates the badge and reports the dose from the daily log for that particular log. In other words this is what you have right now we know. As you can see the employee number is there, and in some places their social security number. These are Privacy information. I can pass it around, but I'd like to get it back.

And this one shows the name of the person, exactly what organization he belonged to, when the time he entered, what his daily log showed at that time. So we would have had your information and the date that you walked in the door of all previous ^ for the quarter and for the year. Then obviously, you have time in.

You hand him his dosimeter. Upon exit, upon exit if the pocket dosimeter reads a positive indication which is high enough to trigger the need for developing the film badge, then the personal dosimeter is actually pulled. It's changed. It's actually still logged, actually was logged in. I can show you some files where they said we pulled that

particular badge.

DR. MAURO: At that time.

MR. CHEW: At that time.

And so because we have actually quite a bit of records of people showing that they had their badges even pulled, either daily or even every other day, and we can see why, because of the exposure levels.

I will probably describe the tests that we're talking about because I think we were able to hone in on ^. The Radiation Safety staff provides the daily update of the film badge quarterly and annual dose for date, allowing them to also maintain an estimate because when they have the daily log when he reads this pocket dosimeter, he will now says, okay, I will add that on to his new estimate. It's only an estimate until the film's record is pulled and then actually processed and recorded.

DR. MAURO: And this is 1966?

MR. CHEW: Well, I'll show you back, this is one that happened to be 1968. We have them all the way back to 1962.

MR. CLAWSON: 'Sixty-one.

MR. CHEW: ‘Sixty-one. Thanks, Brad.

And I’ll show you that particular ^. The Radiological Safety staff also maintains a logbook of activities in the Control Area for the duration of operations occurring ^ air sampling as we talked about, there’s direct survey samples; here’s the instrument. And we can talk about that angle of ^ I can do that because I can tell you the kind of instrument you had. And they look at the ^ radiation.

The personal dosimeter provides the official record for an exposure. And if the dosimeter was lost or the person didn’t come out with it. Remember now we have this situation in this particular time period before the badge was actually attached -- and I’m going to show a badge from probably the 1960s, prior to 1966. And I’m going to focus in on ’62 because we have already deemed ^ ’62 is an SEC period even though we’re not discussing SEC I’m going to use it as a sample here.

If the badge is reported lost or misplaced, an investigation of the incident to determine any possible exposure to an

individual, work assignments, work environments were reviewed. Cohort dosimetries are also reviewed, and the individual was assigned a dose based on the investigation.

What I'd like to do is show, as I said, show this particular ^, and you can pass it around. I'd like to get this back, please. And basically again, it shows where the -- Bryce has just warned me about some of the Privacy information here. I can pass this journal. This one has ^. This one happens to be in 1970. We'll use this one as an example of that.

DR. WADE: Yeah, just so we're sure, so you're passing out something that now contains no individual identifiers?

MR. CHEW: That's correct.

MS. HOMOKI-TITUS: Can we have a look first?

DR. WADE: Okay, can we have the lawyers take a look?

MS. HOMOKI-TITUS: Yeah, this can go to Board members and staff. It can't go to anybody else.

DR. WADE: Okay. So Board members, SC&A,

NIOSH/ORAU can look at it but not the general public.

MR. CHEW: Pass this one around, please.

DR. WADE: Mel, we had a question. What year what this picture taken?

MR. CHEW: Billy, I asked, I was gonna ask you if you can pull down the year for that one, but I didn't remember. Do you remember what year that was?

MR. SMITH: Not exactly. It would have been probably in the area of the '80s.

DR. WADE: Okay, thank you.

MS. MUNN: I was going to say in the late '70s or early '80s because the hat says DOE.

MR. FUNK: I would mention that that was a detection station. During the early years, he's talking about the '60s. He's showing a picture of the '80s.

MR. CHEW: I was using as an example --

MR. FUNK: This did not take place when you were talking about.

MR. CHEW: Oh, okay, I did not --

MR. FUNK: You're insinuating that they had that kind of state-of-the-art detection at that time period when that picture was taken

in the ‘80s, and you’re talking about the ‘70s.

MR. ROLFES: This is ^ of an access control point.

MR. FUNK: Yeah, you don’t necessarily know they had one. ^ you don’t have a picture of it. You’ve got a picture of the 1980s access control point but not a 1970. The DOE didn’t even exist until 1974. That’s a DOE hat --

MR. ROLFES: It’s just to show a picture of the access control points.

MR. CHEW: I have access records I will show you of the earlier years you’re talking about.

MR. FUNK: All right, let’s see all this stuff you haven’t got.

MS. HOMOKI-TITUS: He can’t see anything unless it’s been Privacy Act redacted.

MR. FUNK: You shouldn’t bring up pictures from the 1980s when you’re talking about the 1970s.

MR. CHEW: I fully respect what you’re saying. I think this was just to show an example of a tunnel of how a person was now going through an access controlled area.

MR. FUNK: Yeah, but you were talking at the

time about the 1960s and ‘70s and you’re showing a picture from the ‘80s, and you don’t do that.

MR. ELLIOTT: Well, now, wasn’t there radiological control areas designated in the 1960s?

MR. CHEW: Yes, there was.

MR. ELLIOTT: And those radiological control areas are access points. That’s only ^ an example, a picture, of an access point.

MR. CHEW: Correct.

MR. FUNK: There not always were access points because I had some, I was at a lot of places there was no access point.

MR. CHEW: And we will address this, what you said, too. And you are actually correct.

MR. FUNK: Despite the ^ a lot of ^ .

MR. CHEW: Let’s get back to --

DR. MAURO: Do you know what would be very helpful?

MR. CHEW: Yes, sir.

DR. MAURO: ^ described as ^. Now I’m looking at ^. I don’t know ^ columns are.

MR. CHEW: And I can’t read the headings of the columns. There’s one that’s going around

that's a little clearer.

DR. MAURO: Oh, this is much better.

MR. CHEW: I was trying to test your eyesight there, John.

I think right now, Gen, that John is -- Billy is sitting next to John to explain from each ^ but you can see that.

Let's go back to what triggered this thing was an affidavit from worker number 12. His CATI again on May 26th, he says after working in E Tunnel for about ten minutes his estimated exposure was 5,000 MR, and it turns out that it was put down on his CATI, 4/5/75. So immediately we went to that location ^. It turns out that, yes, there was an event on that day. The event was ^ and located in Tunnel U-12E. And ^ was sort of like N or E Tunnel, that's very good.

Because of the high radiation in the tunnel after this event, there was no entry for anyone on that day. Matter of fact a review of all the access logs indicated that there was no indication that worker 12 ever participated in the ^ event because we were able to find all the access logs.

Well, ^ says, well, let's see where he was. Let's see where we can review and track this issue. I'm going to show you when we asked the Record Center to pull. Unfortunately, because of the Defense ^ Agency's foresight or hindsight, now, they actually pulled every person they find that person's name showed up in a log, a logbook. They put it into a database format. So I was able to go down, and I can now show you this for this particular gentleman here exactly which event that he made his first entry.

And it turns out the event was Hudson Moon, and it was 5/26/1970. I can understand. This was 34 years ago. He missed it by a year because the first time he said '68, and he said it went through ^ 4/5/75. And we walked down that path, and we found nothing, and we came back ^. So his entry was in U-12E on September the 28th, and the event was 5/26/70.

Now why after such a long time? Well, it turns out that there was a strike at the Test Site, and also Hudson Moon had a considerable amount of contamination due to a lack of containment of the over ^ that

happened ^ at the tunnel. This happens to be a very well documented report by DMA, and that's one of the additional information we can find talking about specific events, radiation surveys and re-entry into the tunnel.

So we had him going in on 9/28 on swing shift. And how do we know that? Because we knew when he came through the main gate because he was then issued a new dosimeter. Remember now, every person's film dosimeter is color-coded and his badge was color-coded. And so when Security people in addition to the Rad Safe people we know that he was not wearing the right color-code for the month. They immediately initiated a change. Bryce, do you want to make a comment?

MR. RICH: ^.

MR. CHEW: Sure, I'm going to talk about this ^.

So, John, I want to make sure that I didn't ^ anything ^. I want to make sure I didn't violate anything ^ show you ^.

MS. HOMOKI-TITUS: You can always give it to staff, and you can always give it to ^.

MR. CHEW: That’s all I ^.

MS. HOMOKI-TITUS: Yeah, you just can’t give it to members of the public.

MR. CHEW: John, these are the number of times that he actually subsequently ^ 26 entries into U-12E. And I’m going to home in on the specific day where he thought that he was potentially ^. It is ^ to that level of detail. But I just want to show you that he came in the swing shift and day shift. This happens to be the database I told you about.

He also went back in again called ^ which is U-12T, and that was ^ he went back into ^ that was executed in 1974. He went back on also into ^. He got actually a very small exposure from one of the entries for ^. But the one that we need to focus on is Hudson Moon. I’m going to track this, take this one around. This is a log of all his entries into the tunnel ^.

UNIDENTIFIED SPEAKER: ^

MR. CHEW: No, sir. Those are the name of the events and then the ^ over there. You can see on the Hudson Moon he made 26 entries.

MS. MUNN: And it’s ^.

MR. CHEW: It's on the record.

MR. RICH: This list is generated by querying the database. ^.

MR. CHEW: Yes, and what shift he was.

MR. RICH: ^

MR. CHEW: We can go down to the next level of detail. Now we can go down to the next level of detail. Here is the access log of 28th which is the first day on that one. And here's the log date for the 29th. I can go on and on. But the ^ important point is the one I'm going to pull up and show you --

DR. MAURO: We're waiting for the punch line.

MR. CHEW: It's coming. You said this is an important issue, John.

DR. MAURO: Absolutely.

MR. CHEW: We want to give it its due process.

Let me show you there's one for October the 6th, and his name is second from the bottom. You can see that there's a pic data that he received. And the third one I highlighted, John, on the left-hand side, and here's the one for 10/6.

Gen, John is looking at a specific access log for the gentleman we're talking about, a daily access log. And this was in 1970.

DR. ROESSLER (by Telephone): Are you talking to me? I can visualize --

MR. CHEW: I was just talking to you.

DR. ROESSLER (by Telephone): Okay, thanks.

MR. CHEW: We've got John with a piece of paper in front of him.

So, John, I think one of the questions you asked is, gee, I wonder if this is available. And we said, and I think Billy and me, we said, yeah, and it's more than yeah. Let me describe what's in here because there was a Livermore device for the Department of Defense experiments here in E Tunnel in a particular ^, a very important experiment because these experiments were still looking at vulnerability of critical weapons ^.

A review of the formal Defense Nuclear Agency report at Hudson Moon operationally described that on October 6th -- I pulled this directly from the report -- a two-by-three hole post was cut into the test chamber number

two. And the chamber was entered by a team dressed in double anti-C suits, hoods, footies and gloves wearing a full face mask. It's in the report.

The entire chamber was covered with a deep 12 inches approximately layer of fine dust ash. Well, we don't want to get ^ okay? The first attempt at removing the dust from the test chamber involved a slurry technique. Water was added to the dust and the resulting mixture was pumped out of the test chamber. This technique was employed ^ that the water was not sprayed on any of the extremities.

Let me tell you why I've given this amount of detail ^. Because when I first saw the affidavit in which you said he washed down, I said they didn't wash out the tunnel. That didn't happen. I said I don't know ^. Well, I was wrong.

It turns out that I thought water was never used in the tunnel to wash down. Worker number 12 was correct in his affidavit. They did go and wash down, one of the unique. I ^ the interview one of the health physicists who, a radiation supervisor. And I said have

you ever washed down a tunnel. He said, oh, no, not that I remember. Well, in this particular case he remembered very well. It was certainly a special case.

So due to the radiation level now in the test it's safe to assume as you can see by the record, and we're going to give the one for the ^, he was not only wearing, he is given two pic pocket dosimeters because when they go into a test chamber that we already know that's high radiation, the surveys will show that there were high radiation fields in there already. ^ into the chamber. Typical Livermore scientists want to get in and get that stuff right away. But those folks during that particular entry was given two dosimeters. One 200 MR dosimeter and one, at least a one R or five R dosimeter.

UNIDENTIFIED SPEAKER: ^

MR. CHEW: No question, no, no, question.

And so based on his dosimetric record and looking at some of the cohort that went in there -- he didn't go in by himself -- the gentleman received on October 6th, 240 rem and that was also agrees with what his pic data

showed. I can pull that ^. And the same thing they did on October the 7th. So his pic reading was, his film reading was 240 on October the 6th, 215 on October the 7th. His pic data on that day was 310 and 300, respectively.

DR. MAURO: So when he walked in he came with a history of a quarter of what?

MR. CHEW: He had a small exposure to the part ^ it's like 100 millirem prior to that. But you can see that on that particular, on the date entered on the 7th where they put down.

MR. RICH: He came back onsite on 6/28 and went directly --

MR. CHEW: Nine/28.

MR. RICH: Nine/28, yes, 9/28 and went directly out to the tunnel, a swing shift. He worked, but he never received any ^. But he worked continuing days with multiple changes of personnel ^ on a daily or monthly basis. ^.

MR. CHEW: Well, John, I think ^ I'm going to show this is his film dosimetry record ^. I'm going to pass that to you, John. You can

see it and pass it around. This is 1970, and you look at the first times he had exposure, that is the date when the film badge was issued. You see first thing? Look in the left-hand column there.

DR. MAURO: That's where I'm looking.

MR. CHEW: No, on the left-hand column where his doses are, right there. Yeah, there you go. He walked in the building, 1,000. That's what it says, 1,000, right, which is the gate entry?

DR. MAURO: Yeah.

MR. CHEW: And he was issued the badge on 9/28?

DR. MAURO: Yeah.

MR. CHEW: And he received exceptional exposures. They pulled his badge.

DR. MAURO: So here was a case where the pocket dosimeter showed some --

MR. CHEW: No question, every time.

MR. RICH: Well, he wore the badge from 6/28 'til 10/1. And then the pic gave it a reading, and then that --

MR. CHEW: You can see those certain dates there where they pulled. It was like six and

seven. They obviously pulled it on the sixth.

DR. MAURO: So what I'm reading here is that ^ and pulled his badge and read it that day. I just want to make sure ^.

MR. RICH: Right, right. They pulled the badge that day and read it ^.

DR. MAURO: They read the exposure that's on the badge that day.

MR. RICH: Yes.

DR. MAURO: So in effect what we're saying is right now we have ^ that we not only know, now we have his badge, cumulative exposure from the badge he wore up to some point in time. Then he went into a location where he experienced a relatively high ^, and at that time they pulled the badge and read it there. And the reading that came back from that day was ^.

MR. CHEW: Uh-huh. So, John, I'm going to show you this chart. You can look at this table. And this actually is part of my second part of my talk about the reading. But I just want to point out that this gentleman that was talked about is right up on top here, okay?

Gen, we're just showing another chart,

one other table to John, about the specific ^ in relationship to his film badge that the gentleman that's in here.

DR. ROESSLER (by Telephone): I think you're trying to keep me awake, aren't you?

DR. WADE: You'll be the only one, Gen.

MR. CHEW: Gen, I'm going to move along because everyone else is falling asleep.

John, in summary here worker 12 received his major exposure in Hudson Moon in support of the ^ experiment. And to clarify, John, of your comment, there's really no evidence for worker 12 is not wearing his film dosimeter during the time that he was ^. Nor after careful reading of his affidavit -- I think you kind of skimmed quickly and combined a couple of things -- he never said that he was not wearing his badge. He never did. He said other things happened, but he never, on that particular incident, he never said ^. But I just wanted to say this is how you said, and I just wanted to clarify ^.

DR. MAURO: There's no doubt that this what I just heard is that for this particular affidavit, this claim, there was some

misunderstanding.

MR. CHEW: Yes, there was. And I ^.

Just show one more thing. This is another control picture of -- I like this one -- of people reading the pic data.

DR. MAURO: I think that first of all it's incredible ^.

MR. CHEW: Yes, it's available, uh-huh.

DR. MAURO: Now what's wonderful about this there is a very serious concern ^ that there was a widespread practice of not wearing your badge. ^, well, at least in this one, there was a misunderstanding.

MS. MUNN: ^ radiological ^.

DR. MAURO: Exactly. That was the real concern though because those affidavits tell us a story.

MR. CHEW: Well, I'm going to talk about this in the next part of the --

DR. MAURO: Okay, keep going.

MR. CHEW: I'm going to do one more thing here. As you know the Nevada Test Site badge went through a little bit of ^ change. Prior to 1966, since 1965 in fact, clearly the film dosimeter was on a separate clip, and it was

not physically attached to the badge. And so clearly a person could, for instance, put his film in one place here and still has the badge. We recognize that. And so that's very important. I'm setting the stage for the next part of the --

DR. MAURO: That was '66, right?

MR. CHEW: That was prior to 1966.

DR. MAURO: Prior to '66 they were separate. Post they were --

MR. CHEW: After '66 they were --

DR. MAURO: That's what I'm saying, yes.

MR. CHEW: I also brought a picture that Billy was able to find of how that badge was constructed, of how that film badge was constructed. I also have brought today for the badge that people are actually using today, right, Billy? Okay, it is the same one today.

And I'm going to open it up, and also hold the person's security badge to show it's not a simple process to do. There's a neutron dosimeter behind there, and that's a new one here, and the TLD badge is here. So it's very hard, you have to have a special tool to pull

it out. You can pry it with a plier to get it out, but you really have to work at it.

This badge was part of the old badge, old film badge because they still had that open window. This will just show you they went ahead and changed ^ but did not change the security badge. That open window with that film now is tucked in here, John, and so, and then this is put over the packet and you can see how it was assembled. Actually, I look at things from right to left and you look, I'm looking at it from down here.

DR. MAURO: I think as a general, from our previous discussions ^, once the film badge is integrated as the security badge, there's much less concern --

MR. CHEW: Yes, there is.

DR. MAURO: -- of this practice. The real concern was the affidavits that claimed this was widespread. Now here you've demonstrated, I mean, ^, you shot that issue down. If you remember one of the things we talked about is this is one way, this is very important.

MR. CHEW: Absolutely.

DR. MAURO: I mean, I realize ^ but this is

the whole ball game here. In other words if this practice that was ^ as being widespread, and you can demonstrate over and over and over again in case upon case that this did not happen, and you have references to prove it --

MR. CHEW: John, I'm going to go move on because it's getting a little late.

This is what I consider, what I call issue number two. And the issue number two, and I'm going to try to sort of summarize, is there any evidence of workers not wearing a film badge dosimeter in a radiological-controlled area. We were asked on December 19th on a conference call with the working group to either respond to this question or propose a methodology to address, to appropriately address this issue.

DR. MAURO: I was there, right.

MR. CHEW: You only asked for feasibility. You didn't --

DR. MAURO: These are the answers ^ .

MR. CHEW: There was holidays and Christmas and everything. Well, John, I'd like to recall and quote you again and apologize at your suggestion, John, as you always are

outstanding in coming up with a process to ^. I'm going to quote. I'm going to quote. We've known each other too long.

You know there is any way to track, say, okay, there's a bunch of ionization -- it was a very good suggestion by the way, John -- chamber that will red out. I don't know if there are in the records, I mean that this would be almost like prima facie evidence of yes or no whether this is going on and if there is a record of pic readings and if in the same month, let's say, -- I'm quoting you directly -- you find, yeah, this person had a record in the log somewhere that said their pocket ionization chamber read whatever number was in the record and we recognize the pocket ionization chambers are not nearly as reliable as film, but when looking at the film record, and he received for the month a reading of zero, then this is basically what is being claimed in some of the SEC affidavits.

This would, you know, if we see I'm looking at it this way is indirectly I understand your argument -- when I talk about Table 1 -- but I believe I have to say after

reading the petitions that, my goodness, I would sure like to find out whether or not for this particular person's, and a person's that gave particular claims in an affidavit, whether or not his or her actual dose for that month, you know, was reported at zero, but his pic he claimed has recorded at least, you know, maybe some dose and does any -- and then you asked the question, does anyone on the phone know whether pocket ionization chambers had a written log to maintain.

And Mr. Smith, Billy, says, this is Billy. And you say, yes. And, this is Billy Smith. And the answer is yes. There are logs maintained of any pic readings that people ^ in an area. And they were recorded on logs, and these records would be maintained at the Record Center.

So first of all I'd like to say I want to thank both Bryce and Billy, and especially the nuclear testing archive record manager who spent many, many hours during this particular holiday at the NTS Record to achieve your ^. First we had to find access logs. There were positive pic readings the results that were

high enough so ^ the trigger of ^. I mean, a person comes out with a 30 MR pic, they're not going to do anything, right? That's no good, huh? But, you know, the levels, ^. His level seems to be around about 30 MR a month.

DR. MAURO: That was the trigger?

MR. CHEW: Yeah. I think it was not like a firm 30 RM, but I think the RC radiation technician monitors, you know, look at that very carefully especially looking at what other people are coming out with. ^. Then we had to retrieve the dosimetry records and to find to see if any positive film data was recorded corresponding to about the same time period. Remember, the time you pulled the badge and then he has it on for several days. When it was issued we get issued days. And so there was a lot of searching.

Well, John, I've already showed you worker number 12, right? And certainly, you can conclude that he was wearing his badge especially the time that he was in a radiological-controlled area. We have about 15 or 20 without radiological data^. Twenty-five results that clearly there were positive

pic readings and there were film dosimetry readings. And this is where I'm going to again --

DR. MAURO: Let me just ask a question. Is that ^? That is we just went and looked for positive --

MR. CHEW: ^ first.

DR. MAURO: And do that first and then say, okay, let's --

MR. CHEW: I have to admit that I ^, too, John. You have to go to certain events that they had those things happen.

DR. MAURO: To see positive.

MR. CHEW: Yeah, yeah, to see we had to go, and fortunately there was a very clear record of almost every shot and especially in the tunnels. And a shot in the tunnels then these particular reports helped. That helped me, for instance, home in on some ^.

I wouldn't gone to Hudson Moon initially first because the data that was given to us was incorrect or mistaken. So I have to say, yes, in order to find positive pic data, we had to go to some events that clearly that we know that people went in and

we see exposures. I'm losing Arjun already, so I better move along.

DR. MAKHIJANI: Because I know the punch line.

DR. MAURO: So now the story has been told. I mean, everyone's hearing the same story is that you were sort of forced to go to events.

MR. CHEW: Absolutely.

DR. MAURO: Because that's the only way you're going to get a positive reading off the ^.

MR. CHEW: So it's not as random as you would ^.

DR. MAURO: But you did the best you could. And when you do that there's always a film badge reading. ^, and you got 25 out of 25.

MR. CHEW: Twenty-five out of 25.

MR. RICH: Let me add just a little bit. We were constrained a little bit by a time period, '61, '66 time period. And --

DR. MAURO: That's a ^.

MR. RICH: -- well, pushed us into '70, I know, but we --

MR. CHEW: 'Sixty-two, '61.

MR. RICH: We looked at the individuals that

were the highest exposure group, and so that pushed us into an area that we would expect to find high-level tests or pics that would trigger a subsequent badge collection.

DR. MAURO: ^ when you picked up ’61 --

MR. CHEW: ‘Sixty-two.

DR. MAURO: -- and ^. So you got part of the SEC period, and you got part of the --

MR. CHEW: The badge, separated badge ^.

DR. MAURO: So you had to ^, and you had no choice but to get into it in a reasonable way to get handle, go to places where ^.

MR. CHEW: Sure, ^ would make sense.

DR. MAURO: And there are two aspects to that ^. One is that strictly ^ what we’re trying to do because you’re looking for the people that might have gotten high exposures ^. But also at the same time it happens to be a situation that was under a lot of scrutiny. In other words ^ the situation, right? ^. So it’s almost like, I’m trying to figure out how the ^. One aspect really argues in your favor, namely that if it was going to happen anywhere, it would happen here because this is where the high doses were. Unfortunately, one

downside is, well, it's also the place where everybody was really paying attention.

MR. ROLLINS: A comment on that is any area that someone would have known that the radiation levels were going to be significantly elevated would have been close to ^.

DR. MAURO: There's nothing we can do about that.

MR. ROLLINS: What I'm saying is that these were unusual situations and in any, I believe, any situation where a worker would have been alerted to the fact that he may need to leave his badge behind would be closely monitored.

DR. MAURO: I have to say that this is very, very compelling. What it means to me is that it looks dangerous when you say ^.

DR. MAKHIJANI: Don't say it.

MR. CHEW: No, let him say it, Arjun, that's okay.

DR. MAURO: Because I do this all the time and, you know, ^. I'll say it this way. You just made the case that you looked at 25 badges as random as you can do, you need the exposures that are relatively high where you

would get a positive ^. And in each one of those cases, you had a consistent reading from a film badge that was providing, at least from your perspective, evidence that is unlikely in those 25 circumstances where the person left his badge behind ^. That's the story you're telling.

And in order to extrapolate from that and accept it at face value, one would conclude that if there was such a practice, it sure wasn't very widespread. I mean, I'm not a statistician, but 25 out of 25, the probability ^ what the chances are randomly hitting 25 and none of them, now I'm not going to make a statistical statement, but I guess I'll stop here. I think you did exactly the thing as best you could that SC&A asked to be done. And I guess I should stop right there.

MR. CHEW: And maybe I should, too.

MR. RICH: Let me just add one more thing. If we limit ourselves just to the tunnel, there were some major experiments, surface line-of-sight shots ^, the silos.

MR. CHEW: We could get into a more detailed discussion because we analyzed every one of

them and not only tracked it to the event and things that happened. And one person actually was very hot in this exposure, actually approaching the annual limit, and that was all there. And then remember we talked about ^.

DR. MAURO: If I ^ that worker, some of those workers there believe that in fact they did reach^. They really believe that. If I heard the story, I'd have to say I don't know what I would think. I mean an intellectually honest person, I've got to tell you all these years I believed ^. ^ we showed this thing to us I would have to say I must be mistaken. That's what I would say.

MR. CHEW: I'm going to probably close with item number three. This is a little bit of expansion of, the first one was a specific individual we talked about to show you the depth of track-ability. The second one was what we talked about with pic.

The third one is really what I consider the common themes among the many other ^. They say there were situations that they recall when they were not wearing their badge and could not wear their badge, either

the film badge or the security or both. I'll just say we recognize there's a policy, and I'll just read you the policy and then I'll go on to that.

During the years of '57 to '93 it's the policy at the Test Site that all individuals who enter the Test Site had to wear a current personal dosimeter. Prior to '87 the dosimeter used was a film badge and was exchanged on a monthly basis -- to answer your question on that -- each one had a different color and was validated at the entrance gate at the NTS by the security force contractor.

In 1987 the dosimeter was changed from film to a thermoluminescence dosimeter, TLD as we all know, which was exchanged on a quarterly basis. Each of the calendar quarters had a different color identifier like the badge I showed, and was also validated at the entrance gate at the NTS by the security force contractor.

We can certainly envision that there are certain working, there are working conditions or situations where it's necessary

to protect the badge from damage. ^ put it in my pocket. I can put it in a plastic bag. I put it away because I was welding. Examples of this is probably welding, wet environment, even chemical or even radioactive contamination if ^. In these cases the badge was intended to be enclosed in a plastic cover or put into a pocket.

DR. MAURO: I was never concerned about that.

MR. CHEW: Because many of the workers lived at the Test Site and the base Test Site like Mercury, Area 12 -- I did myself -- base camp or any more remote sites, you can envision certain situations where individuals may not have either his film badge or his security badge on his person here.

Some of these examples were ^ of his living quarters, participating in sports, individual recreation activities, undergoing medical examination. Generally, however, security credentials were worn to the mess hall, to the theater or while attending other off-hours site activities.

The fundamental question is was

individuals ever in a radiological situation or condition when he was not being monitored by either, either personal dosimeter badge or other active or passive radiological programs, activities in place at the time. That's the fundamental question.

DR. MAURO: I would say the argument you're making are problematic arguments. The other argument ^ data for 25 people ^ possibly get to make your case, and I think that's ^. I guess I would love to hear what some of these folks who wrote the affidavits ^. In other words, Jim, it's hard to talk, what I'm getting at is ^ to believe that this is going on. Well, obviously they were wrong.

DR. NETON: You've got to be careful. I don't think you want them ^ they're being confronted.

DR. MAURO: No, I'm not confronting. I guess what I'm saying is unfortunately --

DR. MAKHIJANI: You know, I think they're big issues, and a lot of people have made statements. A lot of NIOSH and Mel's group has done a lot of work, and I think that we should take a considered look at this work.

If we're charged with looking at this as an SEC issue, I know Mr. Presley ^, this is not the forum for it, but it has, this particular thing has gotten mixed up with the SEC issue because it was brought up, the SEC affidavits are being considered.

I think somebody responsible for the looking at that, I want to talk with the people who wrote the affidavits and it's part of our jobs to do interviews with petitioners. And we have really not seriously begun that process. So the conclusory (sic) talk in an early stage makes me very uncomfortable. I can certainly hear what is going on, but conclusory talk, I have to say that I haven't had a chance to look at it. I haven't even read the whole petition completely. That summary, I'm certainly aware of what's in these -- you know, we've just begun our work.

And in regard to the TBD issue it's kind of different. When we're talking about SEC I think we should be cautious.

MR. ROLFES: We did address this as a site profile issue.

DR. MAKHIJANI: And I agree.

MR. ROLFES: And also it was brought up as an SEC issue by Dr. Mauro at the last meeting.

DR. MAKHIJANI: Yes, and I'm not saying that you gave us. It has gone over in that direction and that's the only reason, and I think maybe we should carry this over. And I would suggest for Mr. Presley maybe at this stage, we could close it out as a site profile issue and carry it over and do investigation for the SEC. I'd be okay with that.

DR. MAURO: I also want to say that there's no doubt in my mind that you folks ^.

MR. CLAWSON: There is one thing I would like to get though. Where did they come up with these names? Is it just something playing on the radio?

MR. PRESLEY: Sometime you said --

MR. CHEW: I happen to be part of the Livermore group that actually, how do you decide the names. One time they said let's name it after all the rivers of Maine. Okay. Narraguagus happens to be a river in Maine. You know why I remember that is because I was involved with that ^. But many of the PLOWSHARE events, Dr. Gary Higgins -- do you

remember him, Lynn? He liked the things that moved or changed so he named it after things that carry people, ^, Chariot, Buggy, Cabriolet.

MR. PRESLEY: Those towns in Texas. One year they were cheeses. One year they were wines.

MR. CHEW: All of the DOD shots were always two names.

MR. PRESLEY: Two names.

MR. CHEW: Like Diesel Train, Hudson Moon, Mighty Oak.

MR. CLAWSON: Well, I was thinking dining car Cadillac, it’s time to eat or something.

DR. WADE: Okay, where are we?

MR. CHEW: I just want to make one more thing ^. And this is maybe address a fundamental question. I recognize you would like to, ^ to a separate discussion. But in addition to the pocket dosimeter assigned to the individual, there were many other levels of monitoring exists. Can we talk a bit about that?

They exist to assess the potential exposures ^ no matter where they are. We have

continuous monitoring in both control areas, general site, radiological and radiological control areas. In the general site areas there were environmental air samplers. There was environmental dosimeters. There were periodic radiological surveys of the areas including at the housing area, the office, work office and cafeterias, the operational work areas. I didn't put this together. The person at the Archive Center did that.

Doses for the individuals can be assessed using the same methodology for the lost badge, use a coworker dosimeter and monitoring data for each location cited. It was normal procedure for the worker if there's any reason for their dosimeter was either lost of not returned. And also locations are sited within a radiological control area, access ^.

DR. MAURO: As the Board's contractor I think that where we are, you are responding to the direction given by ^ ^ but taking it on face value ^. So I want to just ^. I don't think there is a working group right now for Nevada Test Site SEC.

MR. CHEW: That's correct. There isn't.

DR. WADE: That will come up later this week.

DR. MAURO: Would it be fair to say that this should be one of the first items on the agenda by the Nevada Test Site SEC working group as to what should be done next? Because there really is --

DR. MAKHIJANI: The Board ^ that.

DR. WADE: The Board will --

DR. MAKHIJANI: -- ^.

DR. MAURO: There's nothing for us to do. That's what I'm saying is my understanding of it now is I think you've provided the information. Whether or not the working group would like us to look at that material, certainly we could do that. Or if the working group feels that you ^, you certainly provided your case. So there really is nothing ^ but there's really nothing more for me to say.

DR. MAKHIJANI: Yeah, I already suggested we close it as a site profile issue and move the ^ of some of the affidavits that needs to be carefully considered, and we have a head start on your response.

MR. ROLFES: It has to be carefully

considered --

DR. MAKHIJANI: As an SEC issue. We can stop discussing it here.

MR. PRESLEY: Is that in the form of a motion?

DR. MAKHIJANI: I am not authorized to make a motion. It's a suggestion.

MR. PRESLEY: I'm going to mark 20 closed. There's a good statement in here that says, in conclusion, the analysis of the data clearly demonstrates that there was no systematic pattern for NTS personnel to remove their dosimeter in order to continue working in radiation areas. And I took out the word reason because there was definitely reason, but I feel like that there was more monitoring. Maybe somebody did take their badge off. There was more monitoring went on than what they knew.

So I'd like to mark this one closed if that's the consensus of the working group, and I've looked at all of the other items that we had, the comments back in the back. They are all marked closed. The only thing that we still have open is 11, and that is going to be

discussed and cussed with SC&A and HHS.

What I'd like for everybody to do is let's look at a time when we can meet before March the 4th, a face-to-face in Cincinnati, and I think it's going to take a face-to-face in Cincinnati all day long to probably iron this thing out. Y'all don't think so?

DR. MAKHIJANI: I don't think so, no.

MR. ROLFES: A call might do this.

MR. PRESLEY: A call might do this? Okay, let's let you all do your work, and if you think it can be done with a call, we'll do it with a call. But at this point there is no conclusion for the working group that I see on the acceptance to the site profile.

DR. WADE: What will happen is that NIOSH and SC&A will arrange for a call. They'll notify the working group members that can sit in if you like. John will keep detailed minutes of the discussion and provide that summary. Then the work group can look at that work product and decide if it needs to engage or not.

DR. MAKHIJANI: I have a question about that.

MR. PRESLEY: Has all of the information that Mel had, has everything been picked up from --

MR. CHEW: Yes, I need to have those picked up.

MR. PRESLEY: We need all the information Mel had picked up, the Privacy Act information, so please --

MR. CHEW: I think I have it.

DR. MAKHIJANI: Now, there are, just for the record, I think we have not received the revisions to the internal dose, and we have not -- there are a number of issues that NIOSH has responded, but we have not, and the working group ^ them up. There are many issues in the NIOSH response and no examination of that by SC&A because we haven't seen the detail of that.

DR. WADE: I think before the work group can conclude its work, it needs to look at where things are in that continuum and decide if it wants to instruct its contractor to see if, indeed, the remedy was engendered as planned or if the work group wants to make that judgment.

MR. PRESLEY: Do you have any idea ^?

MR. ROLFES: Those documents should be approved. I know we've received a couple of revisions at NIOSH for a final review and approval. We did have some internal comments on one of the documents, and I believe we'll reserve any comments at this time.

MR. PRESLEY: Meet as soon as possible.

MR. ROLFES: We're doing our best, but we continue to receive information, and we want to make sure that it's included.

MS. MUNN: Is it possible that we might have a resolution from the technical team ^ the Board call on February the 20th? Is that possible?

MR. ROLFES: We'll do our best to, we always strive to meet goals, and we'll do our best to shoot for that. If not all of those documents are approved by that time, I certainly hope that the majority of them will be.

MS. MUNN: I was asking more about --

DR. WADE: The one open issue.

MS. MUNN: -- our outstanding item, whether your technical group could --

MR. ROLFES: I believe most of the

calculations have been completed for issue 11 for the external geometric correction factors from environmental contamination. I think we can possibly address that ^. Would you agree with that, Gene?

MR. ROLLINS: Well, we have to have a meeting of the minds about where the problem is.

DR. MAKHIJANI: Have we seen those calculations?

MR. ROLLINS: It was written in 2006.

MR. ROLFES: Yeah, I sent them back in 2006.

DR. WADE: So you guys are going to schedule a call so we can sharpen that issue or resolve that issue. And then the work group will hear of that hopefully before February 20th, but we'll see.

MR. PRESLEY: Anybody have anything for the good of the working group?

(no response)

MR. PRESLEY: Let's close this meeting.

DR. WADE: Thank you all.

MR. PRESLEY: Thank you all very much.

(Whereupon, the work group meeting adjourned at 10:00 p.m.)

1 **CERTIFICATE OF COURT REPORTER**

STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of Jan. 7, 2008; 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 8th day of April, 2008.

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STEVEN RAY GREEN, CCR, CVR-CM

CERTIFIED MERIT COURT REPORTER

CERTIFICATE NUMBER: A-2102