

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

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON  
RADIATION AND WORKER HEALTH

LINDE SITE PROFILE

The verbatim transcript of the Working  
Group Meeting of the Advisory Board on Radiation and  
Worker Health held in Las Vegas, Nevada on  
January 8, 2008.

*STEVEN RAY GREEN AND ASSOCIATES  
NATIONALLY CERTIFIED COURT REPORTERS  
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C O N T E N T S

Jan. 08, 2008

WELCOME AND OPENING COMMENTS DR. LEWIS WADE, DFO	6
INTRODUCTION BY CHAIR	12
COMMENTS BY DR. STEVE OSTROW, SC&A	14
COMMENTS BY MR. JOE GUIDO, ORAU	16
DISCUSSION BETWEEN NIOSH AND SC&A	21
RADON DATA ISSUE	27
RAFFINATES	32
EXTERNAL DOSE MODEL	45
BURLAP BAG ISSUE	55
OUTDOOR SOURCES OF RADIATION	78
WRAP-UP	78
COURT REPORTER'S CERTIFICATE	82

### TRANSCRIPT LEGEND

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

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

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

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

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

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

(By Group, in Alphabetical Order)

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ELLIOTT, LARRY, NIOSH  
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HOMOKI-TITUS, LIZ, HHS  
HOWELL, EMILY, HHS  
MAURO, JOHN, SC&A  
NETON, JIM, NIOSH  
OSTROW, STEVE, SC&A  
ZYTONE, ABE, SC&A

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

(8:08 a.m.)

1  
2WELCOME AND OPENING COMMENTSDR. LEWIS WADE, DFO3  
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**DR. WADE:** Good morning, this is Lew Wade, and I'm sitting with the work group. And we're going to begin our deliberations. This is the work group looking at Linde Ceramics site profile, chaired by Dr. Roessler, members: Beach, Gibson and Lockey. Beach, Gibson and Lockey are here in Las Vegas around the meeting table. Dr. Roessler is participating by telephone in Minnesota where it's cold and blustery.

If I'm not mistaken, Gen, have you asked Dr. Lockey to chair this meeting?

**DR. ROESSLER (by Telephone):** No, I asked him if he could be my backup in case I didn't participate, so I'm prepared to chair it.

**DR. WADE:** Very good, thank you. We're pleased that you're able to do that.

**DR. ROESSLER (by Telephone):** Jim will help since he's onsite.

1           **DR. WADE:** Okay, and he'll make sage and  
2 wise comments at the appropriate time.

3                         What we'll do is we'll begin with some  
4 introductions around the room here, then we'll  
5 have our friends by telephone introduce, and  
6 then we'll begin the important deliberations  
7 of the work group. Let me start by asking are  
8 there any other Board members who are  
9 participating on this call by telephone other  
10 than Dr. Roessler?

11                         (no response)

12           **DR. WADE:** Any other Board members on this  
13 call?

14                         (no response)

15           **DR. WADE:** The reason I ask is that we  
16 technically can't have a quorum of the Board,  
17 and we don't. We simply have the four work  
18 group members participating.

19                         Now by way of introduction in the  
20 room, and again I would ask that the  
21 NIOSH/SC&A team, NIOSH/ORAU and SC&A  
22 participants identify whether or not they're  
23 conflicted for the Linde site.

24                         This is Lew Wade. I work for NIOSH  
25 and serve the Advisory Board.

1           **MR. GIBSON:** Mike Gibson, Advisory Board.

2           **MS. BEACH:** Josie Beach, Advisory Board.

3           **DR. LOCKEY:** Jim Lockey, Advisory Board.

4           **MR. CRAWFORD:** Chris Crawford with OCAS, not  
5 conflicted.

6           **MR. GUIDO:** Joe Guido, ORAU team, not  
7 conflicted.

8           **DR. OSTROW:** Steve Ostrow, SC&A, not  
9 conflicted.

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

12          **DR. WADE:** Please shout out.

13          **MS. BONSIGNORE:** I'm Antoinette Bonsignore  
14 with the (inaudible) facility.

15          **MS. ADAMS:** Nancy Adams, NIOSH contractor,  
16 not conflicted.

17          **MS. CHANG:** Chia-Chia Chang, NIOSH, not  
18 conflicted.

19          **DR. NETON:** Jim Neton, NIOSH, not  
20 conflicted.

21          **MS. HOWELL:** Emily Howell, HHS, not  
22 conflicted.

23          **MR. ELLIOTT:** Larry Elliott, NIOSH, not  
24 conflicted.

25          **MS. HOMOKI-TITUS:** Liz Homoki-Titus, HHS,



1 not conflicted.

2 **DR. WADE:** Gen, just as a sound check, were  
3 you able to hear everyone first around the  
4 table and then back away from the table?

5 **DR. ROESSLER (by Telephone):** I could hear  
6 Joe Guido and that's very important. I could  
7 not hear Steve Ostrow very well, and it will  
8 be very important at least for me to hear him.  
9 I can hear John Mauro, Jim Neton, Larry and  
10 Liz.

11 **DR. WADE:** So you heard everyone at the  
12 table except Steve. So Steve is now  
13 repositioning.

14 Steve, could you do a sound check,  
15 please?

16 **DR. OSTROW:** Can you hear me now, Gen?

17 **DR. ROESSLER (by Telephone):** Oh, I can hear  
18 you fine. That's good.

19 **DR. WADE:** And again please shout out if  
20 anyone making a statement here is not  
21 completely understandable. Again, we can  
22 adjust the microphone positions.

23 Let's now go to those on the telephone  
24 and start with members of the NIOSH and ORAU  
25 team. Any other NIOSH/ORAU team members on

1 the telephone?

2 **MS. HOFF (by Telephone):** Jennifer Hoff,  
3 ORAU team, no conflict.

4 **DR. WADE:** Welcome.

5 Other members of the NIOSH/ORAU team?

6 (no response)

7 **DR. WADE:** How about members of the SC&A  
8 team?

9 **DR. BEHLING (by Telephone):** Hans Behling,  
10 SC&A, no conflict.

11 **DR. WADE:** Good morning, Hans.

12 **DR. BEHLING (by Telephone):** Good morning.

13 **DR. WADE:** Other members of the SC&A team?

14 **MR. ZYTONE:** Abe Zytone.

15 **DR. WADE:** We have a new member.

16 You're going to have to sit and speak  
17 into the microphone and identify yourself,  
18 please.

19 **MR. ZYTONE:** Abe Zytone.

20 **DR. WADE:** Abe, are you, do you have  
21 conflicts relative to the Linde site?

22 **MR. ZYTONE:** No.

23 **DR. WADE:** Okay, thank you.

24 What about now other federal employees  
25 who are on the call by virtue of their

1 employment? Any other feds on this call who  
2 are working on this call?

3 **MS. BERMINGHAM:** I'm not sure if I count.  
4 This is Sara Bermingham in Senator Schumer's  
5 office.

6 **DR. WADE:** You certainly count. Thank you.  
7 Any other federal employees on the  
8 call?

9 (no response)

10 **DR. WADE:** Are there any petitioners,  
11 workers, worker representatives on the call  
12 who would like to be identified for the  
13 record?

14 (no response)

15 **DR. WADE:** Any other members of Congress or  
16 their staff on the call who would like to be  
17 identified?

18 (no response)

19 **DR. WADE:** Is there anyone else on the call  
20 who would like to be identified for the  
21 record?

22 (no response)

23 **DR. WADE:** Okay, I think those are our  
24 introductions. Very briefly again if you're  
25 not speaking, please mute the instrument that

1           you're using so we don't pick up background  
2           noises. Be mindful of background noises where  
3           you are. They might be routine and common to  
4           you, but they can be very distracting to  
5           others. So just police your own area relative  
6           to your phone system. And again, if you have  
7           any trouble at any point, just call out, and  
8           we'll make the necessary adjustments.

9                         With that, Gen, it's all yours.

10           **INTRODUCTION BY CHAIR**

11                         **DR. ROESSLER (by Telephone):** I'd like to  
12           make a few comments before we delve into the  
13           review of the matrix. First of all with  
14           regard to our work group activities, we held  
15           our first meeting on March 26<sup>th</sup>, 2007, and at  
16           that time we looked at 22 issues raised by  
17           SC&A after their review of the Linde site  
18           profile which by the way is called a TBD on  
19           the website. NIOSH and the ORAU team, Chris  
20           Crawford and Joe Guido, then went over those  
21           issues and came up with their response in  
22           November of this year.

23                         Then Steve Ostrow -- and thank you,  
24           Steve, for your promptness on this -- of SC&A  
25           assessed the NIOSH response to see which items

1 are now closed and which ones are still open.  
2 I want to comment that it's helpful I think to  
3 remember that all atomic workers employees who  
4 worked at the Linde Ceramics plant from  
5 October 1<sup>st</sup>, 1942 through October 31<sup>st</sup>, 1947,  
6 are an SEC. I think we need to keep those  
7 dates in mind.

8 In order to follow this discussion,  
9 work group members, if you have three  
10 documents, I think we can get through this  
11 fairly easily. The most important one is  
12 SC&A's January 3<sup>rd</sup>, 2008, latest assessment,  
13 and this is the matrix we will cover. NIOSH's  
14 November 29<sup>th</sup>, 2007 document which is titled,  
15 "NIOSH Response: Linde's TBD Issues," will be  
16 helpful. And then also the TBD is on the  
17 website, and that's dated January 19<sup>th</sup>, 2006.

18 We are going to then look at this SC&A  
19 matrix. There are still six open items:  
20 number two, seven, eight, 13, 17 and 22.  
21 Again, I appreciate Steve's quick response to  
22 this in putting it together because it has  
23 gone to NIOSH. So I'm assuming they have seen  
24 this, NIOSH and ORAU, and will be able to  
25 respond.

1                   We do have a short time this morning.  
2                   There's another group meeting at ten, and I  
3                   think we'll have to be done probably about,  
4                   you know, before that. So I would suggest,  
5                   Lew, that about 9:45 we need to stop and  
6                   evaluate where we are.

7                   **DR. WADE:** I'll mark that down.

8                   **DR. ROESSLER (by Telephone):** So I think at  
9                   this point we'll turn it over to Steve and  
10                   Joe, Steve with SC&A and Joe with the  
11                   NIOSH/ORAU team.

12                   Probably, Steve, you will want to lead  
13                   it?

14                   **COMMENTS BY DR. STEVE OSTROW, SC&A**

15                   **DR. OSTROW:** Okay, that sounds good.

16                   As you said we had the 22 comments and  
17                   NIOSH produced a quite extensive document on  
18                   November 29<sup>th</sup>, a 25-page response to our  
19                   comments that is very good. It's very  
20                   detailed.

21                   It turned out that a number of our  
22                   comments were related to each other so in a  
23                   couple of cases, one NIOSH comment -- several  
24                   of our comments that really puts those issues  
25                   to bed. There were certain different

1 categories. One of them was on the internal  
2 exposure model.

3 We had some questions about the  
4 original way that it was done. Originally  
5 they were using air concentration data as a  
6 basis for the occupational internal dose  
7 estimation. After our discussion at the last  
8 meeting, NIOSH is now using a different model.  
9 They are using a coworker bioassay model that,  
10 and this basically answers a number of our  
11 questions on your model.

12 We still have, we basically accept, we  
13 agree with their approach that they're using  
14 the methodology from ORAU Procedure 0095 which  
15 is generating summary statistics for coworker  
16 bioassay data. That's their basic methodology  
17 they're using. And we support the approach.  
18 We had reviewed this in a different task. We  
19 were looking at the individual procedures.

20 On comment two we still had marked it  
21 as open because we just had a short question  
22 about it. I'll just read what I've written.  
23 The NIOSH response states that -- and this is  
24 a quotation -- "the intakes calculated using  
25 coworker data extending through January 1950

1           during Step III operations, were extended  
2           through the end of the operations period which  
3           is currently listed as 12/31/53 by DOL because  
4           these intakes are believed to be bounding  
5           during the final decontamination phases at the  
6           site."

7                     And our only comment is I'd like NIOSH  
8           to just elaborate a little bit, go one step  
9           further and just state why you think these  
10          intakes are bounding.

11          COMMENTS BY MR. JOE GUIDO, ORAU

12                    **MR. GUIDO:** Sure, sure. I mean, well, one  
13          thing is to look at -- I should identify  
14          myself I guess. This is Joe Guido. One thing  
15          you need to look at is what activities  
16          occurred in that period because the coworker  
17          data that we're using appears to be joining  
18          the Step III operations. And the final sample  
19          in that is labeled a determination sample.

20                    And if you look at the, there's  
21          reports, they're not the monthly reports, but  
22          there's like monthly operation reports that  
23          give you the staffing level of Linde over a  
24          period of time. And if you look at those  
25          reports, the staffing level was obviously



1 decreasing very quickly in that period. So by  
2 the end of 1950 there were very few people  
3 left at the Linde site doing very much.

4 And the only activity that was there  
5 relevant would be the decontamination that was  
6 remaining. And the decontamination reports  
7 that you look are also authored in the 1950-  
8 '54 period. Most of the decontamination was  
9 actually done, and then there was  
10 communication back and forth about little,  
11 limited activities that were going on as far  
12 as -- and there was some significant activity,  
13 sandblasting, flame cutting and stuff to get  
14 the last of the contamination out of the  
15 building.

16 What makes me believe that we're still  
17 being claimant favorable and bounding is there  
18 is some documentation, summary documentation  
19 of the airborne levels during that  
20 decontamination, and that's in a May 3<sup>rd</sup>, 1954  
21 memo. It's a summary. The summary levels  
22 talks about the average 48-channel air samples  
23 found to be, the average is 78 DPM per cubic  
24 meter, and the high is 720 DPM per cubic  
25 meter. So if you look at that airborne level

1 that was occurring during the D&D that's still  
2 bounded by what we are giving them from the  
3 coworker data.

4 **DR. MAURO:** What is that, the operational  
5 data that you're saying, what is that  
6 distribution compared to the --

7 **MR. GUIDO:** It's much higher than, it's a  
8 higher level than that.

9 **DR. MAURO:** Factor of two, ten?

10 **MR. GUIDO:** At least 33 mag\*, so 33 times 70  
11 at the start versus, so we're about a factor  
12 of ten.

13 **DR. MAURO:** Factor of ten.

14 **MR. GUIDO:** And then the other thing that's  
15 of interest is even in that same memo they're  
16 saying how the dust concentrations were much  
17 lower during the previous decontamination  
18 except one or two which happened in the '49  
19 period, the earlier period. So I think that's  
20 why it's bounding. Plus the struggle with all  
21 this of course is that the number of workers  
22 that were really exposed to that are probably  
23 quite small, but I guess that's not an issue  
24 here.

25 **DR. OSTROW:** Joe, I didn't catch it. When

1 was this memo you're referring to, what was  
2 that --

3 **MR. GUIDO:** May 3<sup>rd</sup>, 1954. Actually, do you  
4 have -- I'm not sure if it's on the Linde -- I  
5 don't know what access you have to the Linde  
6 data that we have. We used site research  
7 database reference numbers, and the reference  
8 number would be 35-732. It's page, that's a  
9 53-page document. It's one of those documents  
10 that's a compilation of memos so you'd have to  
11 look at page 20 of that. It's an individual  
12 memo.

13 **DR. OSTROW:** So it's 35-732?

14 **MR. GUIDO:** Yes. And if you need to go  
15 further it's a memo from Klevins (ph). I  
16 guess he was the industrial hygienist, branch  
17 section for (inaudible) Linde. So he, they  
18 were basically summarizing the data that they  
19 had collected during that operation.

20 **MS. BEACH:** Can you find that on the O  
21 drive?

22 **MR. GUIDO:** Yes, if you go into the site  
23 research database tool, there's a tab like  
24 three pages down where you can just enter the  
25 reference ID, and you can just type in that

1 reference ID, that 35-732. And like I say  
2 that's a, it's a hard one because it's just a  
3 compilation of lots of memos so you have to go  
4 to page 20 of the PDF, and you'll find it. If  
5 not, let me know. You can give me  
6 (inaudible).

7 **MS. BEACH:** I know how to get there.

8 **MR. GUIDO:** I mean, the other thing you can  
9 tab Linde and get all of that and just scroll  
10 through this one because it's probably near  
11 the end.

12 **DR. NETON:** This is Jim. I'm not sure that  
13 the work group has access to these, the site  
14 research database tool. What we've done is  
15 we've put those on the O drive under the  
16 Board's folder. It's our X drive.

17 Chris, are you familiar with that?

18 **MR. CRAWFORD:** I'm familiar with the  
19 contents, but I don't know how to access it.

20 **DR. NETON:** We can make that available on  
21 the --

22 **MS. BEACH:** I've actually been on it, but I  
23 was having trouble last night getting into the  
24 ones I was trying to look at.

25 **DR. NETON:** I'll talk to Chris, and we'll

1 put that document on the O drive that you  
2 normally access.

3 **MR. GUIDO:** I have it up here on the screen  
4 if anyone wants to look at it.

5 **DISCUSSION BETWEEN NIOSH AND SC&A**

6 **DR. OSTROW:** I think that that answers my  
7 question. I just wanted to know what your  
8 reference was basically for doing this. So as  
9 far as SC&A is concerned, we think NIOSH  
10 answered our comment to satisfaction now.

11 And I just mentioned the NIOSH  
12 document where they responded to us, the  
13 November 29<sup>th</sup> document. They had organized it,  
14 not comment by comment by comment but  
15 basically by topic. And this topic which is  
16 their Section 2.0 on urinalysis data actually  
17 deals with a number of our comments, comments  
18 two, three, four, nine, ten, 12, 19 and 21.  
19 And basically it answers the, either all or  
20 most of our comments in those issues.

21 Let's see, what's the next one that --

22 **DR. MAURO:** Steve, I just wanted to make  
23 sure I got the line because I think I got the  
24 linkage of how this works. So you have these  
25 bioassay data, urine sample data, taken during

1 the phase three operations at Linde. And  
2 there's a distribution of values, and it's a  
3 large enough sample. I understand it's a  
4 fairly large sample.

5 You used the upper 84<sup>th</sup> percentile. In  
6 other words in that distribution now when  
7 you're reconstructing the doses for a worker,  
8 you're assigning to that worker, let's say he  
9 does not have a bioassay sample, you're going  
10 to be assigning the upper 84<sup>th</sup> percentile to  
11 the --

12 **MR. GUIDO:** We defined the distribution for  
13 a geometric mean and geometric standard  
14 deviation to use the 95<sup>th</sup> percentile.

15 **DR. MAURO:** Oh, use the 95<sup>th</sup> percentile?

16 **DR. OSTROW:** Oh, because I was wondering  
17 because the ORAU Procedure 0095 goes up only  
18 to the 84<sup>th</sup> percentile, right?

19 **MR. GUIDO:** Well, I think the Procedure  
20 defines calculating those values, I mean doing  
21 dose reconstruction it just depends on how  
22 you, it's applied, you know, apply the 95<sup>th</sup>  
23 percentile.

24 **DR. MAURO:** That's where I'm going with  
25 this. In other words I'm visualizing. You

1           have this dataset. You have a nice  
2           distribution of numbers, and now you have a  
3           worker that you want to reconstruct his,  
4           during that time period, the Phase III time  
5           period that you don't have bioassay data.

6                     And so from that distribution you're  
7           going to pick either some value or some  
8           distribution. My understanding is that you're  
9           planning on automatically assigning as a  
10          default the upper 84<sup>th</sup> percentile. Or is it a  
11          judgment call on a case-by-case basis?

12                    **MR. GUIDO:** I don't know where the 84<sup>th</sup>  
13          percentile assignment comes from. I've never  
14          --

15                    **DR. MAURO:** Okay, that's the one signet.

16                    **DR. NETON:** Yeah, I think the 84<sup>th</sup> percentile  
17          is used to calculate the geometric standard  
18          deviation distribution, 84<sup>th</sup> over the 50<sup>th</sup> and  
19          get the GSD of the distribution. That's never  
20          really been assigned to workers.

21                    **DR. MAURO:** Okay, so what would be assigned  
22          to so-called worker that we don't have  
23          bioassay --

24                    **DR. NETON:** What Joe is saying here is that  
25          for a worker who was not monitored and should

1 have been monitored, we're going to assign the  
2 95<sup>th</sup> percentile. That doesn't mean that some  
3 people might not get the 50<sup>th</sup> percentile if  
4 they were not routinely involved in radiologic  
5 operations.

6 **DR. MAURO:** And that we covered --

7 **DR. NETON:** That's covered in this, yeah.

8 **DR. MAURO:** Now the next level -- I'm just  
9 trying to put this whole thing in a nice  
10 package for myself. The next level is then  
11 you have a period of time where you enter a  
12 post-Phase III operation where you move into a  
13 D&D mode.

14 **DR. NETON:** Right.

15 **DR. MAURO:** Now what I'm hearing is that  
16 you're going to use the distribution from the  
17 Phase III exposures, let's say the 95<sup>th</sup>  
18 percentile, to the D&D workers also. And the  
19 reason you feel that's claimant favorable, and  
20 I understand what you're saying, it says,  
21 well, we have a hook on the problem.

22 Namely, we've got air sampling data  
23 during Phase III. We've got air sampling data  
24 during the D&D operation, and there's evidence  
25 that the levels, the airborne dust levels,



1 during the D&D were substantively lower than  
2 they were during Phase III by it sounded like  
3 almost a factor of ten. So on that basis you  
4 feel comfortable that you've got it, you've  
5 got this problem in a box.

6 **MR. GUIDO:** Right, and we're not comfortable  
7 enough with just using the, you know, this  
8 summary air data is just not in a format  
9 where, I mean, the best thing to do is if we  
10 had specific data during that period. We just  
11 don't have the high quality data. In other  
12 words the understanding of the data to just  
13 use it directly. In other words if we were to  
14 use the lower concentration during D&D, that  
15 would probably be better.

16 **DR. MAURO:** But in this case because of the  
17 limited data, but some evidence that --

18 **MR. GUIDO:** It's bounding.

19 **DR. MAURO:** -- that you're bounding it.  
20 Okay, I got it.

21 **MR. GUIDO:** I hope you like the format I  
22 tried to put on this because I know it was  
23 like from March to now, a long time. That's  
24 why I linked all of those together.

25 **DR. OSTROW:** Yeah, it's a good thing. Yeah,

1                   it's easier this way rather than just  
2                   repeating it ten times, you know, same thing.  
3                   It's easier when you grouped it.

4                   Okay, so the next thing that we had  
5                   considered open was our comment number seven.  
6                   That was on radon.

7                   **DR. ROESSLER (by Telephone):** This is Gen.  
8                   It's a little hard to hear, but I assume what  
9                   happened on comment two is that John Mauro has  
10                  accepted your bounding procedure?

11                  **DR. MAURO:** Yes, SC&A has looked at this.  
12                  We discussed it. I just tried to capture the  
13                  sense of it as I understand it and as we  
14                  discussed it. And, yes, we find that  
15                  scientifically sound and a compelling position  
16                  to take, claimant favorable and scientifically  
17                  valid.

18                  **DR. ROESSLER (by Telephone):** Okay, thank  
19                  you.

20                  So go ahead then, Steve.

21                  **DR. WADE:** Steve, please speak up, Steve, if  
22                  you will.

23                  **DR. OSTROW:** Okay, I'm sorry.

24                  **MR. GUIDO:** I'm loud enough where I probably  
25                  don't need that.

1           **DR. OSTROW:** Yeah, I'm moving the microphone  
2 around a little bit.

3                     You hear me okay now, Gen?

4           **DR. ROESSLER (by Telephone):** I was on mute.  
5 I can hear you, Steve, but speak as loudly as  
6 you can.

7           **DR. OSTROW:** I can be quite loud. It's  
8 good. I'm from New York, and usually I'm  
9 louder than this.

10           **RADON DATA ISSUE**

11                     Next is item number seven which is on  
12 the radon data. Our original comment was that  
13 we wanted NIOSH to elaborate on the location  
14 of ores that could be producing the radon, and  
15 the treatment system and basically what  
16 happened to the radon-producing isotopes and  
17 tailings piles. And NIOSH answered this with,  
18 let's see, which comment is it? Oh, there it  
19 is. It's section three, "Treatment of Radon  
20 Data". Okay, that's covered then in section  
21 four in raffinates.

22                     NIOSH apparently did some research  
23 into the documents and tried to identify where  
24 all the raffinates, the African ores and the  
25 raffinates ended up, looking at different data

1 sources. And they produced a table on this.  
2 And we think it's pretty thorough. We just  
3 had one further comment though. We just  
4 wanted to know that based on all the data that  
5 NIOSH had looked at, were there any other  
6 sources of radon that were identified other  
7 than the ores that are identified in this  
8 table.

9 **MR. GUIDO:** I mean there's, we didn't find  
10 any evidence of any other, you know, the  
11 material, the raffinate materials, all the  
12 evidence was that was removed from the site as  
13 far as being a bulk source of activity.  
14 There's nothing else that we found I could  
15 find in any of the references. I probably  
16 read through several, probably all the leading  
17 references a couple times trying to find other  
18 documentation. Everything went to the  
19 national (inaudible) and (inaudible). It  
20 created quite a big mess as far as moving  
21 those piles of stuff around.

22 And then there also is the  
23 segregation. Some of them went to  
24 (inaudible). I guess the issue was the  
25 radium-bearing material was a resource at the

1 time so it moved, you know, to one location  
2 and then the other stuff wasn't really useful,  
3 but it was moved offsite. That's all I could  
4 find.

5 And the radon samples we're using, I  
6 think the question there was the 1945 period.  
7 There really are some radon measurements in  
8 the 1977 in the further surveys which are  
9 quite low. Now I know that understanding a  
10 lot of time has passed. And what we're  
11 proposing for that period is like a ten  
12 picocuries per liter assignment based on the  
13 concentrations during the period of domestic  
14 ore processing which would be the lower  
15 radium-containing ores.

16 And the idea being that during the  
17 real period we're talking about they weren't  
18 doing any ore production. This is not to say  
19 that there wasn't maybe some radon emanation  
20 from some ore that accumulated in a corner  
21 somewhere we just don't know about. But the  
22 idea would be that those levels shouldn't have  
23 been higher. They should have been bounded by  
24 the levels during, when they were processing  
25 ores.

1                   And then if you look at the surveys in  
2                   the late '70s, in the later periods when they  
3                   did do surveys of the buildings, there were  
4                   some radon measures that were quite low. So  
5                   it wasn't like there were pockets of material  
6                   still there. And that's the best we can do  
7                   with the information we have, unfortunately.

8                   **DR. MAURO:** This is John. When we were  
9                   discussing this as it was explained to me by  
10                  Steve is that during the SEC period it was  
11                  prior to the end of the SEC period that there  
12                  were no longer any raffinates or pitchblende  
13                  being processed or raffinates in storage or  
14                  being handled onsite. That's, from our  
15                  experience in working at so many of these  
16                  other uranium ore processing sites, we're  
17                  always very sensitive to the radon and the  
18                  raffinate and the thorium associated with the  
19                  raffinate question.

20                  And the answer that you provided here  
21                  is very, you know, the evidence is that it  
22                  looks like there wasn't, that that material  
23                  was removed during the SEC period. And you  
24                  really don't have an inventory onsite for the  
25                  time period of interest here. And we found

1                   that to be, that is really the rock you're  
2                   standing on, and we accept that. And that  
3                   being the case, we concur.

4                   **DR. LOCKEY:** What was your higher bound  
5                   level you were using?

6                   **MR. GUIDO:** Ten picocuries per liter is  
7                   what's assigned for --

8                   **DR. LOCKEY:** What was that based on again?

9                   **MR. GUIDO:** That was based on the radon  
10                  measurements during the processing of domestic  
11                  ores at Linde. They had a period where they  
12                  did African ore processing, and then they did  
13                  a period of doing domestic. I think the  
14                  domestic ores were eight percent uranium. I'd  
15                  have to look that up, but it was lower  
16                  concentration of uranium in the ore as opposed  
17                  to the African ores they were doing. But they  
18                  did radon measurements during the processing  
19                  of that ore.

20                  **DR. LOCKEY:** And the reason they used  
21                  domestic versus African?

22                  **MR. GUIDO:** Well, the African ore is much  
23                  higher, the idea being during the time when  
24                  they were doing any ore processing at all,  
25                  just to bound that exposure we used the

1 domestic ore radon levels. It would seem  
2 reasonable because the African ore was first,  
3 you know, they did that. They stopped that  
4 then did domestic ore processing. And then  
5 they started moving on to concentrates and  
6 stuff, and then they shut that down completely  
7 and moved to other operations which was  
8 concentrates of uranium oxides.

9 **DR. OSTROW:** This is Steve again. I think  
10 we conclude based on what we've just heard  
11 SC&A considers that comment seven is closed  
12 now.

13 **DR. ROESSLER (by Telephone):** Thank you.  
14 What I think I heard John Mauro say is the  
15 reason it's closed is because the material was  
16 removed before the period of interest. And so  
17 what NIOSH is going to do is use a ten  
18 picocurie per liter bounding number.

19 **DR. MAURO:** That's correct.

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

21 **RAFFINATES**

22 **DR. OSTROW:** Comment number eight that I had  
23 was on the, comment seven was radon. Comment  
24 eight is on the raffinates in particular. And  
25 NIOSH discussed that in Section 4.0 of their



1 recent report. We had a further comment on  
2 that. Let me see what it was.

3 This is a little bit of a technical  
4 question, and I'll read it, but I hope NIOSH  
5 people reading it, what I've written. Table  
6 4-2 of their recent report presents isotopic  
7 data to soils and sediments in various site  
8 locations. And Table 4-3 presents progeny to  
9 uranium ratios for several isotopes. That's  
10 in the new document.

11 Going back to Linde's site profile,  
12 Table 5 of this site profile presents uranium  
13 intake fractions for several nuclides which  
14 were determined by assuming secular  
15 equilibrium of the uranium progeny. It's not  
16 clear to SC&A how Table 4-2 of the new NIOSH  
17 response relates to Table 5 of the TBD and how  
18 the former values are intended for use in dose  
19 reconstruction. I mean, we couldn't, we're  
20 not claiming that they're incorrect. We just  
21 didn't exactly see how they're connected to  
22 each other.

23 **MR. GUIDO:** Right, well, yeah, and the  
24 tabulation that's there was done in response  
25 to just the question of what kind of

1 information you have on raffinate ratios on  
2 the nuclides. That was the raw format of it.  
3 Now, how it gets incorporated into a revision  
4 of a TBD that's used by dose reconstructions  
5 is another matter.

6 However, I think that the pertinent  
7 table here, the Table 4.2, is the summary.  
8 And then there's another table in the  
9 response, Table 4-3, which kind of like it  
10 boils it all down to what's the minimum and  
11 maximum nuclides and ratio we found, like one-  
12 to-30 radium, 4-to-32 actinium protactinium,  
13 sometimes there are nuclides that we're really  
14 interested in here, you know, large doses.

15 The table in the TBD, Table 5, is  
16 meant purely to give dose reconstructors an  
17 idea of how you're dealing with uranium ore.  
18 Here's what secular equilibrium for uranium  
19 ore looks like. And some of it is not  
20 necessarily obvious because when you're  
21 talking about total uranium, you have Uranium-  
22 238 and 234.

23 You have to break those in half and  
24 necessarily exactly in half. You know, many  
25 of the actinium and (inaudible) daughters. So

1           that table's there to kind of break all that  
2           down so that we're all on a common page as far  
3           as dose reconstruction. That still would  
4           stand in a revision of the TBD because that's  
5           still pertinent information for uranium ore.

6                     Now what we're talking about here with  
7           the raffinates is really the salient point is  
8           the dose reconstruction during the non-SEC  
9           periods. We're in the period post-1947 no  
10          longer dealing with ores, but the reality is  
11          when we look at the data for the material  
12          that's residual, that's still there, it had,  
13          all of you know it obviously had Thorium-230,  
14          radium and other nuclides there.

15                    So the intent would be during dose  
16          reconstruction for those periods you'd need to  
17          account for that exposure. The current TBD  
18          during that period would just give folks just  
19          uranium exposures under the idea that that's,  
20          you're dealing with uranium concentrates for  
21          uranium oxide, and really all their daughters  
22          are pretty much gone. But I think the  
23          evidence is that there was residual material.

24                    And unfortunately, when we, like  
25          looking at that bioassay data that we

1 summarized, that's uranium bioassay data.  
2 Most of that uranium is probably lost during  
3 the processing of uranium oxide and really  
4 doesn't contain any progeny still. But you do  
5 have the uranium progeny there as far as the  
6 residual surface contamination inventory  
7 because they found it in '77.

8 And so you have no choice but during  
9 dose reconstruction to account for that  
10 exposure. Because when you're looking at the  
11 uranium bioassay data, you know how much, you  
12 know, we had a good handle on how much uranium  
13 was inhaled by these workers. We just don't  
14 know what uranium. Was it re-suspended  
15 uranium that's in this matrix containing the  
16 raffinates, containing the other nuclides or  
17 was it process emissions. Most of it probably  
18 is, but we don't know where that is.

19 What, you know, that's the whole  
20 problem we have with these kinds of sites. So  
21 we have to be claimant favorable and take the  
22 bounding approach which is to use the ratios  
23 from the re-suspended material which these  
24 represent. I mean, that's what the Table 4-2  
25 and the Table 4-3, the summary, represents

1 isotopic ratios on the debris and stuff. And  
2 that's what I tried to pick.

3 I tried to pick values that were --  
4 it's very relevant. It was dust and debris  
5 from overhead rafters and in drains and stuff  
6 like that which is, I think, pretty good  
7 representation of what was in the fallout per  
8 se in the building like (inaudible) were  
9 talking about. It may not necessarily be  
10 representative of what was in the air. What  
11 was in the air was what was emitted from the  
12 process.

13 But that's the best we can do to make  
14 sure that we're bounding exposures. So that's  
15 where we're -- Now that would have to be  
16 rolled into the revision of the TBD and how we  
17 use it. But it would not be a direct  
18 replacement, Table 5. This is more  
19 information for, a set up, like I say, a  
20 starting point.

21 **DR. MAURO:** So if I'm doing the dose  
22 reconstruction on a worker during the, well, I  
23 guess it would be during either Phase III, or  
24 I guess you're not doing it during Phase III  
25 because that's covered. No, it's not.

1           **MR. GUIDO:** (Inaudible) is the period we're  
2 talking about.

3           **DR. MAURO:** It is, Phase III, and then  
4 that's separate from the D&D.

5           **MR. GUIDO:** And the D&D.

6           **DR. MAURO:** Now, I have my bioassay data for  
7 uranium. I assume that's milligrams per  
8 liter? In other words --

9           **MR. GUIDO:** Right, yeah, however you want  
10 to, it's going to turn into a picocurie intake  
11 --

12           **DR. MAURO:** You're going to get that now,  
13 and then you're saying, okay, but we have to  
14 assume that some of that if I know the intake  
15 of Uranium-234, I'm going to make some  
16 assumption that there's some 230. There may  
17 be some Radium-226 there, and the way you're  
18 getting a hook onto that is based on the  
19 samples that were taken from the rafters where  
20 it demonstrates, yeah, there's still some  
21 residue of raffinates around even though they  
22 were shipped off earlier during the SEC, but  
23 there's still some residue around. Now you're  
24 saying you have a degree of confidence that  
25 that ratio as obtained from these samples

1 probably places an upper bound because in all  
2 likelihood the actual uranium they're  
3 inhaling, it was Phase III process uranium.  
4 And any thorium that might be there, but  
5 you're going to assign it based on the sample.

6 **MR. GUIDO:** Right, right.

7 **DR. MAURO:** So that's, my reaction to that  
8 is that is claimant favorable because you're  
9 assuming all of the uranium they handled is  
10 contaminated to a certain degree with some of  
11 these thorium isotopes when in fact probably  
12 that, to a lesser degree because it's not part  
13 of the process. It may be something that  
14 might have been re-suspended off the rafters -  
15 -

16 **MR. GUIDO:** If we could get a better idea of  
17 the resuspension of the inhalation that was  
18 occurring that is driving these bioassay  
19 samples, if we can get an idea of how much of  
20 that was process emission versus resuspension  
21 --

22 **DR. MAURO:** Are you going to try to do that  
23 or are you just going to study --

24 **MR. GUIDO:** I don't think we have the data  
25 to do that.

1           **DR. MAURO:** Okay, so you're going to stay  
2 with this ratio.

3           **MR. GUIDO:** Yeah.

4           **DR. MAURO:** By the way where are you on  
5 that? How far, in other words let's say  
6 you're talking Thorium-230. For every  
7 picocurie of 234, what are you assuming the  
8 picocuries --

9           **MR. GUIDO:** It's point -- but the range of  
10 data in the debris that was there was from  
11 0.0018 to 0.7135, seventy percent.

12           **DR. MAURO:** You're talking about the degree  
13 of equilibrium. Is that what you're saying?

14           **MR. GUIDO:** Yeah, effectively that's what  
15 that becomes.

16           **DR. MAURO:** So are you using 0.7 as your --

17           **MR. GUIDO:** Yeah, that's what we wrote in  
18 the TBD, but I mean, I don't see a choice  
19 there. If we don't have a lot data to build  
20 the distribution on this. We have limited  
21 amounts of data on here.

22           **DR. MAURO:** So what I'm hearing then is that  
23 in selecting the isotopic mix for Phase III  
24 and D&D, you're going to tend toward the  
25 higher end of the contribution of the thorium,



1 because thorium's, of course, in a very, the  
2 Thorium-230 is the one we are concerned about  
3 because that has the highest dose conversion  
4 factor.

5 **MR. GUIDO:** And this ought to be worded  
6 relative to the TBD and technically put in  
7 there, but I mean, that's with the data.  
8 That's the data we have right now.

9 **DR. MAURO:** But that's where you're headed,  
10 going toward the high end of that sample taken  
11 from the rafters.

12 **MR. GUIDO:** The rafters, drains. I started  
13 to say there wasn't a whole lot of, but most  
14 of it sewers, rafters, things, you know, where  
15 stuff accumulated which probably represented  
16 stuff that was there.

17 **DR. MAURO:** No, I understand.

18 **DR. LOCKEY:** One question, that Thorium-230  
19 probably is more representative of Phase I and  
20 Phase II?

21 **DR. MAURO:** That's what I'm hearing. Now  
22 there may have been some also produced during  
23 the other ores, the Canadian ores or wherever  
24 they got them from. I mean not the Congo  
25 ores.

1           **MR. GUIDO:** Right, but it was also that same  
2 work processing, it's still the, all this  
3 material was during the SEC period, but it  
4 still was there as far as debris in the  
5 building because they found it in the '70s.  
6 It was still there. But the material coming  
7 in during the Phase III, the uranium oxide,  
8 wouldn't have had these nuclides. They found  
9 little traces, but generally you're not going  
10 to have these nuclides in there.

11           **DR. LOCKEY:** So that's a claimant friendly  
12 approach.

13           **DR. MAURO:** That's how I see it, yeah.

14           **DR. OSTROW:** Okay, if no one else has any  
15 more comments on that, I think the --

16           **DR. ROESSLER (by Telephone):** Steve,  
17 everybody was fading out in the discussions  
18 there. I did hear John Mauro say that he  
19 thought the approach was claimant favorable,  
20 but I would like to have somebody summarize  
21 what the conclusion is on this comment. Maybe  
22 John could do it?

23           **DR. MAURO:** I'd be glad to. The concern has  
24 to do with, it looks like there is a good  
25 handle on the uranium intake. In other words

1                   they have the data, and have captured a  
2                   claimant favorable approach for dealing with  
3                   intakes of uranium.

4                   But then the question becomes, well,  
5                   what about the thorium and maybe radium, and  
6                   other residual material. Well, that could be  
7                   a very significant problem if you're dealing  
8                   with large quantities of raffinates that may  
9                   have been produced during the processing of,  
10                  let's say, pitchblende or Congo ore. And that  
11                  becomes a real serious problem which was  
12                  turned out to be extremely serious, for  
13                  example, down at Mallinckrodt.

14                  But in this case our understanding is,  
15                  well, it's not as serious because all of the  
16                  raffinates were cleared away during the SEC  
17                  period. So in other words after the SEC  
18                  periods these large inventories of raffinates  
19                  with the thorium problems were gone. But, and  
20                  then you move into this Phase III where there  
21                  was processing going on, and there certainly  
22                  was some residue left over that could have  
23                  included thorium, perhaps some radium, and  
24                  that residue is not of a magnitude of concern  
25                  the same as you would have like, for example,

1 raffinates associated with pitchblende ore.

2 But it's still some residue, and you  
3 can't ignore it. In other words you can't  
4 just say, well, during Phase III and during  
5 D&D we're just going to completely disregard  
6 the potential contribution of thorium. And  
7 they said they didn't do that. What they did  
8 is they had to get a handle on what  
9 contribution this residue of thorium and  
10 radium might have played on the intake.

11 So what they did is they have swipe  
12 samples or samples collected from drains, from  
13 rafters and other locations where some residue  
14 from previous operations during the SEC period  
15 were still around. And it's possible that  
16 material could have been re-suspended and  
17 inhaled.

18 So the approach that's being taken is  
19 that, okay, we know the ratio of the uranium  
20 to the Thorium-230 in some of this residue  
21 collected from the drains and other locations.  
22 We're going to assume that that ratio holds  
23 and is applicable to people working during  
24 Phase III and during D&D.

25 When, in fact, that's pretty claimant

1 favorable because that material is less likely  
2 to be the material that's being airborne and  
3 inhaled. It's more likely to be this fresh  
4 material that's being processed. So by  
5 assuming that that material has the same ratio  
6 as what's in this residue on the rafters, it  
7 seems to be very claimant favorable in terms  
8 of making sure that they're not  
9 underestimating the contribution of the  
10 thorium dose during Phase III and during D&D.

11 Did I capture that correctly?

12 **MR. GUIDO:** Yeah, absolutely.

13 **DR. ROESSLER (by Telephone):** Good, I'm glad  
14 that's on the record. So Table 4-3 is  
15 important then in this part.

16 **DR. MAURO:** Yes.

17 **DR. ROESSLER (by Telephone):** In the NIOSH  
18 document. John, I'll try to shorten that a  
19 bit for my summary.

20 I would ask in the next comment  
21 discussion if you and Joe could speak louder,  
22 it would help. There's a lot of noise on the  
23 line. Thank you.

24 **EXTERNAL DOSE MODEL**

25 **DR. OSTROW:** The next open item that we had

1 was item number 13, comment number 13, which,  
2 let's see, this is on the, we're finished with  
3 internal dose. Thirteen and the ones after  
4 that are on external dose model. Thirteen was  
5 multi-part.

6 We had raised several questions about  
7 the external dose model, and actually had six  
8 comments on it. Section 6 of NIOSH's  
9 response, that's the recent November one,  
10 responded to our six individual comments. And  
11 the first one was -- I don't want to read the  
12 whole thing because it's so lengthy, but we  
13 had a comment on one of the methodologies that  
14 why NIOSH picked a factor of three rather than  
15 a factor of four.

16 That's for, that doesn't seem much but  
17 -- hang on one second. I have to go back to  
18 the original comment to see what the  
19 significance of this is. Can you just hang on  
20 one second? I'm looking for my original  
21 comment here. Okay, here we go. My comment  
22 was actually summarized in the NIOSH document  
23 from November, in Section 6. I'm not quite  
24 sure how to summarize this. It's like a whole  
25 page written here. It has to do with Footnote

1 C of Table 13.

2 **MR. GUIDO:** I can help you. I mean, what  
3 this comes down to here is that we had a data,  
4 the problem was that a lot of the data that  
5 we're talking about is very early data where  
6 it was just recorded as units of  
7 (unintelligible) per hour, total beta plus  
8 gamma. So you've got to extract because of  
9 the purpose of this program you've got to  
10 extract how much was a beta component and how  
11 much was the gamma component.

12 And one of the ways we did that, the  
13 ratio, the beta ratio and the gamma ratio was  
14 different. We chose to use the average of  
15 those two. I think your comment is, yeah,  
16 that may be claimant favorable but just go  
17 ahead use the actual. And I think probably  
18 just go ahead do what you suggested there. In  
19 other words just use the beta ratio and the  
20 gamma ratio as separate ratios. And that's  
21 fine.

22 **DR. OSTROW:** I was just wondering, was there  
23 any particular reason you didn't want to --

24 **MR. GUIDO:** No, I think it's simplicity.  
25 Because really the gamma component is

1 relatively insignificant as far as impacting,  
2 you know, the whole job here is to do the dose  
3 reconstruction, be claimant favorable, and we  
4 have to look at the end point which is how  
5 it's going to affect the calculation.

6 I mean, it's a sensitivity analysis  
7 kind of thing. You know, we're looking at a  
8 very low assignment anyway, so to use a factor  
9 of three instead of 1.2. I mean, the factor  
10 is like 1.2. We chose to use three. Well,  
11 three times 15 micro an hour versus one times  
12 it, you know, it's not a big impact, and it  
13 makes it simpler for the process of dose  
14 reconstruction.

15 And in the process if the dose  
16 reconstructor does it, or the peer reviewer  
17 who does it, NIOSH looks at a beta, so you  
18 know, you have all this layers of review, and  
19 if you could simplify the calculation without  
20 affecting claimant favorability and without  
21 being overly claimant favorable, like I said,  
22 the impact here is very low. It's a  
23 multiplier of a very low number. But we can  
24 go ahead and just use the actual. I mean,  
25 it's not like that complex to do that.



1           **DR. OSTROW:** We agree with you that it's not  
2 a, doesn't have any material affect on the  
3 answer, it just looks more accurate to do it  
4 separately, two separate factors.

5           **MR. GUIDO:** There's just a, there's always a  
6 tradeoff of accuracy versus simplicity, and I  
7 didn't author this document, but I know that's  
8 what the process is always looking at. How  
9 can we make the process simpler without  
10 affecting the outcome and be claimant  
11 favorable because in the end that leads to  
12 fewer errors and it leads to a more  
13 streamlining. We don't want to spend a bunch  
14 of money, but we feel the easier we can make  
15 these dose reconstructors the more efficient  
16 it is. That's sensible. But we could do  
17 that, and that's fine. I'll write that note  
18 down for -- I don't think this is something we  
19 need to do a page change, a change, we're not  
20 talking about something of that significance,  
21 but when this document gets reviewed, we can  
22 make that comment.

23           **DR. LOCKEY:** Jim Lockey, one question.  
24 What's the standard practice in another SEC if  
25 you do a similar --

1                   **MR. GUIDO:** For these kinds of things?

2                   **DR. LOCKEY:** Yes.

3                   **MR. GUIDO:** Yeah, there's always a desire to  
4 try to be efficient, trying to develop  
5 methodologies when you're trying to give dose  
6 reconstructors a way to compile exposure  
7 matrices to try to be efficient and stay  
8 claimant favorable. I'm not sure about this  
9 one.

10                                 Like I say, I didn't write, I don't  
11 know whether I would have done this myself or  
12 not, but it doesn't seem unreasonable because  
13 of the magnitude of value we're talking about.  
14 It seems like we're going to do the factor of  
15 three instead of 1.2. That's double what it  
16 should be, but it's double a very small number  
17 of external dose, and it does simplify the  
18 calculations.

19                   **DR. LOCKEY:** Jim Lockey. From my  
20 perspective if it doesn't make a big  
21 difference and is claimant friendly, and it  
22 simplifies the calculation, then leave it  
23 alone.

24                   **DR. OSTROW:** Okay, SC&A doesn't want to make  
25 a strong case one way or the other. We agree

1                   it doesn't affect the answer materially.

2                   **MR. GUIDO:** Yeah, I didn't, you know, I'm  
3 not very strongly motivated in either  
4 direction. I'm just willing to go either way,  
5 just move forward I guess. I mean, it's  
6 really not, it's not going to impact.

7                   **DR. WADE:** And someone with the wisdom of  
8 Solomon needs to resolve this.

9                   Gen, are you aware of the situation?

10                  **DR. ROESSLER (by Telephone):** Yes, I am. It  
11 seems like somebody needs to pick a number,  
12 and we ought to move on.

13                  **MR. GUIDO:** I'm hearing just leave it alone,  
14 and I'm always for leaving things alone.

15                  **DR. WADE:** And SC&A's okay with that?

16                  **DR. OSTROW:** SC&A's okay with it. We could  
17 leave it up to NIOSH to do it either way.

18                  **MR. GUIDO:** Okay.

19                  **DR. OSTROW:** But we're still under comment  
20 13, but there are six sub-comments on it, and  
21 this was just, that was just sub-comment one.  
22 Sub-comment two we accepted already.

23                               Sub-comment three, we accepted NIOSH's  
24 explanation. That relates to survey data,  
25 1976 survey data. We accept their explanation

1 as to why the survey data was used, but we  
2 still had a question.

3 This is going back to the TBD, Table  
4 13, which estimated beta and gamma dose rates.  
5 And the first table Footnote D that's derived  
6 from Table 14, Building 30 radiation survey  
7 values, we weren't, looking at it weren't  
8 clear how the Table 13 data has gotten into  
9 the Table 14 data that's referred to in that  
10 footnote.

11 **MR. GUIDO:** Sure. The issue here is the  
12 same kind of thing. The 1949-'50 surveys  
13 (unintelligible) per hour total beta plus  
14 gamma, and in the interests of trying to break  
15 that into a gamma component and beta  
16 component, that's what this, that's what we're  
17 talking about here, this process. And what  
18 the Table 14 data -- and stop me if I'm not  
19 answering the question -- but the Table 14  
20 what they did is, is that that was a more  
21 contemporary survey where they had beta  
22 measurements and gamma measurements.

23 And from those kind of extracted, you  
24 know, a percentage of how much gamma radiation  
25 versus beta radiation was there. And then

1 that ratio was applied to the readings in  
2 1950s. Basically, what you're trying to do is  
3 break out the value; in other words it's 0.311  
4 is the tabulated contact per hour level in  
5 1949, and we need to figure out how much of  
6 that 0.311 was beta radiation, and how much of  
7 it was gamma radiation.

8 **DR. OSTROW:** Use of the Table 14 the, which  
9 was taken later, which were broken out, so you  
10 can use the same ratio backwards in time to do  
11 that.

12 **MR. GUIDO:** Yeah. And the idea it's not the  
13 same, it's not necessarily the same levels,  
14 but it's the same material.

15 **DR. OSTROW:** SC&A accepts that explanation.

16 **DR. WADE:** Were you able to follow that,  
17 Gen?

18 **DR. ROESSLER (by Telephone):** I think it's  
19 based on Table 14 in the TBD. Maybe explained  
20 where the numbers came from?

21 **DR. OSTROW:** The Table 14 TBD, which was  
22 survey data for Building 30, had separate beta  
23 and gamma listings, and NIOSH used the ratios,  
24 the beta-gamma ratios, and applied it to the  
25 Table 13, which was for an earlier period,

1 under the assumption that it's basically the  
2 same isotopic composition. And we think  
3 that's a good approach. It's reasonable.

4 **DR. ROESSLER (by Telephone):** Okay, that  
5 sounds good.

6 **DR. WADE:** Okay, that summary worked for  
7 you, Gen?

8 **DR. ROESSLER (by Telephone):** Yes. So in  
9 other words they've explained where the  
10 numbers have come from.

11 **DR. WADE:** And the reasonableness of what  
12 they've done.

13 **DR. ROESSLER (by Telephone):** Yeah, okay.

14 **DR. OSTROW:** Sub-comment four, nothing  
15 further. Sub-comment five -- we're still  
16 under major comment 13 -- sub-comment five we  
17 agree with NIOSH said that they would clarify  
18 some footnotes in this table and made a  
19 revision. That wasn't the major issue. Even  
20 though we had problems with it, we just put  
21 the footnotes weren't very clear.

22 **MR. GUIDO:** It was difficult for me even to  
23 reconstruct it when I went through it and  
24 tried to figure out, and I had the  
25 spreadsheet. So I understand. It was a

1 complex --

2 **DR. OSTROW:** It was a very complex table  
3 with a lot of stuff crammed into one table.  
4 But basically that closes that out. We  
5 recommend that closes out our comment 13, that  
6 all the issues under that are taken care of  
7 now. So we'd recommend that comment 13 is  
8 closed as far as SC&A is concerned.

9 **DR. WADE:** Gen, did you hear that?

10 **DR. ROESSLER (by Telephone):** I did. That  
11 sounds good.

12 **DR. WADE:** Okay, thank you.

13 On to, is it 17?

14 **BURLAP BAG ISSUE**

15 **DR. OSTROW:** Seventeen. This is the burlap  
16 bag issue that we had talked about a couple of  
17 times. Here we have a little bit of a  
18 disconnect. It turns out these burlap bags to  
19 bring ore into the site, lots and lots,  
20 thousands and thousands of bags, people  
21 carrying them around. We wanted to know what  
22 happened to the burlap bags. NIOSH did an  
23 investigation of what, where the burlap bags  
24 ended up, and there's an extensive table on  
25 that.

1                   **MR. GUIDO:** It's in Table 5-1 in our  
2 response, page 12, a tabulation on that.

3                   **DR. OSTROW:** Anyway, NIOSH looked at the  
4 records and tried to tabulate where all of the  
5 burlap bags ended up. And it looks like to me  
6 that they were washed out, they had an  
7 incinerator. Some were taken offsite, but  
8 basically they think there were a lot of  
9 dispositions of the bags in the range of tens  
10 of thousands of them.

11                                 Now here's where the disconnect is.  
12 That we had done site interviews with some of  
13 the site experts who were actually at the  
14 time. According to my comment 17 on page five  
15 of my recent document in January, a site  
16 expert interview asserted that thousands of  
17 burlap bags were still stacked behind Building  
18 30 after 1950.

19                                 The direct quotation is, "During the  
20 MED period they stacked all the contaminated  
21 burlap bags in storage area Building 30.  
22 These contaminated bags were kept in there  
23 until they were moved to be burned and  
24 incinerated in the late 1950s. Many of the  
25 people working in Building 30 including



1                   Operation personnel, secretaries and  
2                   maintenance workers, would sit on those bags  
3                   resting or eating their lunch, and this went  
4                   on for many years."

5                   So we have, at least the workers  
6                   thought that the bags were still there until  
7                   the late 1950s which doesn't seem -- They were  
8                   sitting there eating their lunch. That  
9                   doesn't seem to agree with the data that you  
10                  have.

11                 **MR. GUIDO:** And you know, this is a  
12                 difficult subject. We're dealing with  
13                 memories of people who are probably passionate  
14                 about what they remember, and the only thing I  
15                 can add, I mean, we have two pieces of  
16                 information which to me are compelling.

17                 We have 1944 documentation of memos  
18                 between Linde and the AEC saying, hey, here's  
19                 what we're going to do. We're going to --  
20                 because, well, the overriding issue here is  
21                 that uranium ore remained in the bags after  
22                 they dumped them. And they were the resource.  
23                 They didn't burn these bags because it was  
24                 waste disposal practice. They burned these  
25                 bags to track the uranium out.

1                   It was a resource. They knew they had  
2 held up in the bags, and they had this process  
3 where they would shake them over, you know,  
4 shake them. They washed them to get stuff out  
5 just to extract the uranium. And they burned  
6 them to extract uranium. They took the burned  
7 debris and put it back in.

8                   So what we have is we have memos from  
9 Linde to the AEC, communication back and forth  
10 saying, hey, this is what we're going to do.  
11 We're going to wash them; we're going to burn  
12 them. We're going to take the debris and put  
13 it back in to get the uranium out.

14                   We have process manuals from Linde  
15 saying here's what we're going to do. In  
16 other words not communication between the AEC  
17 and Linde, but Linde's procedures saying  
18 here's how we handle ore bags. We wash them  
19 and burn them.

20                   But the compelling piece is in 1981 an  
21 interview was conducted with a former Linde  
22 employee who talked about a lot of things,  
23 talked about a lot of different sites, Simonds  
24 Saw and Linde activities. And his description  
25 of the period at Linde talks about that we

1 washed the bags; we burned the bags, and the  
2 incinerator was in place by 1944. He was very  
3 clear that by October of '44 the incinerator  
4 was up and running.

5 That matches with an AEC memo where a  
6 HASL person came to Linde and said, hey -- and  
7 this is an October memo said, hey, the  
8 incinerator's been running for a few days now.  
9 This is what they're doing and actually even  
10 went as far as talking about the fact they had  
11 19,000 bags stacked up which matches with, you  
12 know, 19,000, that's a lot of burlap bags.

13 That matches with what you're, so I'm  
14 not sure what the, you know, I'd like to think  
15 that someone's recollection of 1950s  
16 activities in 1980 are probably better than  
17 recollection of 1950 activities as seen from  
18 2000. But I can't, I don't know.

19 The other thing I can say is that,  
20 that ore bags, burlap bags, were probably used  
21 for a lot of things. The burlap bags that  
22 were burned were specifically ore bags because  
23 I mean this was a commercial operation. They  
24 probably had it to make money, and that whole  
25 part of the process was not Waste Management.

1                   That was extracting uranium.

2                   So it's not inconceivable to me, and  
3 I'm, this is just conjecture, but it's not  
4 inconceivable to me that if there were other  
5 kinds of bags or stuff around at the site,  
6 that those probably would not have been burned  
7 since they weren't; the burning was for  
8 extracting uranium.

9                   So there's a couple, I don't know that  
10 we're ever going to resolve this. I mean, if  
11 you look at the weight of the evidence, you  
12 know, AEC, the Linde memos, Linde procedures,  
13 and then those are confirmed by a 1980  
14 interview, that's compelling to me. I'm not  
15 being disrespectful to the individual who  
16 mentioned this. I mean, I understand people  
17 are passionate about what they remember.  
18 That's the best I could do.

19                  **DR. OSTROW:** I understand what you're  
20 saying. I'm not sure how we go about  
21 resolving this.

22                  **MS. BEACH:** So is it your contention that  
23 they were keeping up with the burning of the  
24 bags? It was my understanding they were  
25 storing the bags because the burning was

1 taking longer.

2 **MR. GUIDO:** Well, the memo that talks about  
3 the backlog of 19,000 bags was a 1944 memo  
4 when they first started the incineration. So  
5 I think the original process was to wash them,  
6 then they stored the washed ones, and then  
7 they started sorting them. And the interview  
8 in 1981 talks about the fact that, well,  
9 there's a timeline that was provided in the  
10 interview. And the timeline has a period  
11 where they were done burning all the bags.

12 And you've got to understand that the  
13 bags we're talking about are receipt of  
14 uranium ore which stopped in like around '44.  
15 It's not like they continued to receive  
16 uranium ore. All the uranium ore received was  
17 '43 and '44. So by 1945 they were done even  
18 accumulating bags. So if they were starting  
19 to burn in October of '44, and the process was  
20 to recover the uranium in these bags as a  
21 resource, I just can't believe that they would  
22 leave them.

23 Plus, you know, you have -- and that's  
24 not just my belief. We're talking about  
25 having an interview from someone who said that

1 here's what they did. They burned them, and  
2 they finished burning them like I think it was  
3 '46. I don't know if I compiled that in the -  
4 -

5 Did I put the, when they stopped  
6 burning the bags in here? Yeah, 6/26/46. So  
7 I mean they burned them for over a year, a  
8 process of going through these.

9 **DR. LOCKEY:** (Inaudible).

10 **MR. GUIDO:** Well, I mean, I think there's  
11 always drums of material arriving because they  
12 were seeing ore, and they were seeing  
13 concentrates. And concentrates were coming in  
14 barrels, drums or 75 -- what did they call it?  
15 Seven pound --

16 **DR. LOCKEY:** So the bags had stopped in '44,  
17 is that what you're saying?

18 **MR. GUIDO:** Yeah, '44, when the concentrates  
19 weren't received in bags. And you know, even  
20 if they were, the issue here relates to  
21 uranium progeny. I see this more of an  
22 external dose issue instead of an internal  
23 dose. I mean, because we're already assuming  
24 quite a high uranium intake for these workers.  
25 I don't think you could achieve that uranium

1 intake from disturbing these washed bags.

2 What we're really talking about is if  
3 there really were bags with, I think it was  
4 like a couple pounds each bag estimated. And  
5 they had an estimate of how much ore was left  
6 in the bags is why they washed them. But if  
7 you really had those bags there and they sat,  
8 it would probably be a significant radiation  
9 source.

10 Not significant in the form of if you  
11 sat on them two or three hours a day, you  
12 would get some external exposure and maybe in  
13 a pattern that we may not have reconstructed  
14 as far as, you know, the cancers that aren't  
15 going to get very much exposure are prostate  
16 cancers. Well, if you're sitting on bags  
17 containing the right material, the dose to the  
18 prostate is going to be much more significant  
19 than anything you'd estimate. And I think  
20 it's a significant issue if it occurred, you  
21 know, with uranium ore.

22 That's why I'm not sure that it would  
23 be much of an issue if it was just  
24 concentrates. But we have documentation on  
25 how the concentrates came. They didn't come

1 in bags.

2 **DR. WADE:** What's SC&A's reaction, and then  
3 we have to hear the pleasure of the work group  
4 in terms of how to proceed.

5 John or Steve?

6 **DR. MAURO:** I can take a shot at it. And I  
7 guess we're in the situation we've been in  
8 before. I think your arguments, the weight of  
9 evidence argument that you're making is very  
10 strong. I mean, you have lots of records.  
11 But at the same time I really am hesitant to  
12 discount the statement made by a person who  
13 was there.

14 So we have these two pieces of  
15 information, and we're at a place where some  
16 judgment call could be made. The judgments  
17 could be one of two things, that the weight of  
18 evidence is such that the scenarios where  
19 people are sitting on ore bags containing  
20 residue really didn't happen. Or if there's  
21 a, you want to go the other route that says,  
22 well, you know, this person said this was  
23 going on, and if you were to factor that in --  
24 and you described it very well --

25 Let's say we were to give the benefit



1 of the doubt to this question, if there is any  
2 doubt, what the implications are. Well, the  
3 implications are a skin dose and a prostate  
4 dose that might be underestimated. And so I  
5 think the issue is very well defined. It's  
6 not like there's any ambiguity about what the  
7 issue is and what its significance is. The  
8 problem is we're at a point where it's not,  
9 there's a scientific question. It's almost  
10 like what do you do when you're in a situation  
11 like this.

12 **MR. GUIDO:** I do have one other piece of  
13 information which may be, I don't know if  
14 it'll help, but -- and maybe this really  
15 doesn't matter -- but if there were bags of  
16 these, if these ore bags existed as an ore bag  
17 as a significant source of radiation, the 1952  
18 survey of the site done by HASL contains  
19 diagrams of those buildings and of this area.  
20 And there is no depiction of these materials  
21 there.

22 Now I don't know, I can't conjecture  
23 would they have drawn it in, but these were  
24 scientists whose job it was to characterize  
25 the external radiation exposure at the site

1 when Linde was about to abandon it. You know,  
2 Linde was about to turn over. So if these  
3 bags existed as a significant source of  
4 radiation, it would seem like --

5 **DR. MAURO:** They would have captured it.

6 **MR. GUIDO:** -- had it on the map, and it  
7 isn't. But I didn't mean to derail your --

8 **DR. MAURO:** No, no --

9 **MR. GUIDO:** -- I just wanted to add that --

10 **DR. MAURO:** -- that's another level --

11 **MR. GUIDO:** -- another layer --

12 **DR. MAURO:** -- of weight of evidence. I  
13 understand what you're saying.

14 **DR. WADE:** So, Gen, I mean the issues are  
15 clearly on the table. Classically, what would  
16 happen now is the work group could either  
17 discuss this and make a decision. That  
18 decision could be to allow NIOSH to continue  
19 what it's doing. It could be to ask NIOSH to  
20 change what it's doing. Or it could be to  
21 pull another string to see if it's possible to  
22 shed further light on the issue. How would  
23 you like to proceed today? Would you like to  
24 have a discussion? Would you like to table  
25 that discussion for another time? How would

1                   you like to proceed on this issue today given  
2                   the fact that we have a half an hour of usable  
3                   time in front of us today?

4                   **DR. ROESSLER (by Telephone):** I was just  
5                   going to say we do have time. I would like to  
6                   hear the work group members' response to this  
7                   and their advice as to how we should proceed.

8                   **DR. WADE:** Okay, let's just do that. We'll  
9                   start with Dr. Lockey.

10                   Would you have anything you'd like to  
11                   offer, Dr. Lockey?

12                   **DR. LOCKEY:** Maybe I'd like to ask about the  
13                   economics of recovering the ore during that  
14                   period of time. How critical was that? Was  
15                   that a high priority for, in this industry?

16                   **MR. GUIDO:** I think uranium was a resource  
17                   at that time. I think this is the '48-'49  
18                   period where they were ramping up production  
19                   at the reactors, the Hanford reactors needed  
20                   uranium. I think there was, I don't know,  
21                   shortage isn't a good word, but this is the  
22                   early '50s is when they started looking at  
23                   uranium tracking for phosphate facilities,  
24                   which in that, you know, you're talking about  
25                   very low concentration material trying to get

1 out. I would imagine this was a valuable  
2 commodity, and if they -- I thought I put it  
3 in here about how much uranium was in each  
4 bag. It was significant I think.

5 Yeah, 19,000 bags with a pound and a  
6 half of uranium ore in it, you know, probably  
7 like 20,000 pounds of uranium. I don't know  
8 what their (inaudible) was. That seems  
9 significant.

10 **MR. ELLIOTT:** We know it was a precious  
11 commodity. We know that from our Bethlehem  
12 Steel site experience and other sites where  
13 they were trying to recover as much as they  
14 could.

15 **DR. LOCKEY:** So that was my next question.  
16 If you look at other sites was this a common  
17 practice to recover as much as possible in  
18 this type of situation?

19 **MR. ELLIOTT:** And from the literature that  
20 we've looked at for Bethlehem Steel and other  
21 sites, yes, I think I would say that's what  
22 we've come away with. That it was a precious  
23 commodity, and they were trying to recover and  
24 find and develop these other processes like in  
25 the phosphate industry, ways to gain more

1 uranium.

2 **DR. LOCKEY:** I guess my comment then would  
3 be that if this was the common practice at  
4 that time to try to recover as much as  
5 possible because it was a valuable commodity,  
6 then the weight of the evidence to me would be  
7 that the bags, when the bags were recycled,  
8 and there were no longer any available to be  
9 burned, then the process, then that stopped.  
10 And that sounds like what you have outlined  
11 for us.

12 I don't want to discount what other  
13 individuals were saying, but it would appear  
14 that the weight of the evidence is that this  
15 was a valuable commodity. It was being  
16 shipped in. They put in place a mechanism to  
17 recycle it. When the recycling process was  
18 finished, then that recycling process was shut  
19 down.

20 **DR. WADE:** Josie, do you have a comment?

21 **MS. BEACH:** I would just like to know, the  
22 comment that John mentioned. I heard the  
23 comment Joe mentioned. I forgot exactly what  
24 the comment from the other petitioner or  
25 person was that what timeframe those bags were

1 sitting out there. Because it's pretty clear  
2 --

3 **DR. MAURO:** Steve, do you have that time  
4 period?

5 **MR. GUIDO:** But then there's a linear  
6 description. I mean, they described a bunch  
7 of bags sitting around, and then they burned  
8 them. But the timeframe that they're  
9 describing I think is off by about five or six  
10 years.

11 **DR. OSTROW:** Yeah, our site expert that we  
12 had looked at was talking about the bags being  
13 there in the late '50s. And the evidence that  
14 NIOSH came up with and all that what they were  
15 going by the about ten years earlier. And  
16 it's about ten years' difference.

17 **MS. BEACH:** I guess that's the only question  
18 I would have because it's very clear from your  
19 timeline that in '44 they were washed, and  
20 then they were stored waiting to be  
21 incinerated. So that's what I'd like to see  
22 cleared up, is just the timeline.

23 **DR. WADE:** Mike, a comment?

24 **MR. GIBSON:** Was this the interview that  
25 took place on April 10<sup>th</sup> of '81?

1           **MR. GUIDO:** Yes.

2           **MR. GIBSON:** It just seems that he goes into  
3 some detail about the process and so I'm  
4 always hesitant not to give the added weight  
5 to the worker's comments. It's not, he  
6 doesn't seem to be vague about any of the  
7 process, so I'd have to believe what it says.  
8 He remembered the time and the process.

9           **DR. WADE:** We have the '81 interview, and  
10 then we have another worker interview in 2000,  
11 and they're in dispute.

12           **MR. GUIDO:** But what's interesting here is  
13 what they're saying is the same. The  
14 interview that you have in 2000 is describing  
15 the same process; the only difference is the  
16 timeline. And I don't remember if you asked  
17 what I did 15 years ago, but here we are  
18 asking workers what they did 50 years ago and  
19 asking them for dates.

20                   And here you asked this worker what he  
21 did 30 years ago and asked him for dates. And  
22 the dates that this worker gave in 1980 match  
23 up with the documentation that we have for  
24 Linde. Like in other words we just had the  
25 Linde to AEC memos, those are hard because

1           that could just be describing what they intend  
2           to do, what they're going to do. You know  
3           what I mean? We do have the memo from HASL  
4           saying, hey, they started incinerating so we  
5           know they actually did follow through. They  
6           were incinerating in '44.

7                        So having the '81 interview match up,  
8           to me those dates seem credible. The other  
9           interview, the process is right. It's just a  
10          matter of the dates. And I guess I can't see,  
11          I can easily see how, you know, late '50s,  
12          late '40s maybe, the question would be what  
13          that worker who said that, would they have  
14          been there in the '40s? That could be a  
15          thread that you could pull.

16                   **DR. WADE:** Gen, do you have anything you'd  
17           like to add at this point?

18                   **DR. ROESSLER (by Telephone):** Yes, I think I  
19           haven't heard everything, but I think my  
20           concern is like Mike's, for the workers and  
21           are we giving proper credence to what they  
22           remember. And I wanted to follow up on what I  
23           heard John Mauro start to say about giving the  
24           benefit of the doubt. I would like to ask  
25           NIOSH how significant would that be or how



1 much of a problem would that be to use that  
2 approach?

3 **DR. WADE:** I think what Gen is asking is if  
4 you were to assume that the second interview  
5 was the one you were going to take, and there  
6 was a pile of bags sitting around with 19,000  
7 pounds of uranium left in them, what would be  
8 the issue? What would you have to do? What  
9 could you do in terms of taking that into  
10 account in terms of certain dose  
11 reconstructions?

12 **MR. GUIDO:** You would have to (inaudible).  
13 And the problem here is because the problem  
14 with uranium ore, it's not just uranium, I  
15 think we've done scenarios with very close  
16 quarters of uranium metal, and we wouldn't  
17 have much of an issue. With the uranium ore  
18 we would have a little bit of an issue as far  
19 as exposure.

20 We would have to take a look at, we  
21 would basically do an exposure, an external  
22 exposure model for someone sitting on those.  
23 You know, you're talking about the prostate  
24 would probably be the ones that get some  
25 external dose. We would have to go through

1 and do that. I don't have those calculations  
2 done.

3 **DR. WADE:** Gen, I might make a suggestion.  
4 Again, this is a clear issue of facts around  
5 the table. What the work group could do is  
6 ask NIOSH to just summarize these arguments in  
7 a standalone document. I think we know  
8 exactly what's been put into play. There've  
9 been questions asked by Dr. Lockey about the  
10 economic importance.

11 I think if NIOSH could prepare a  
12 document that would present all of the facts,  
13 explore them as they've been explored and  
14 render its conclusion, then the work group  
15 could look at that document and decide how it  
16 would want to proceed. So you could stop  
17 there. You could ask NIOSH to go further and  
18 ask them to develop an exposure scenario if,  
19 but I think it might be more reasonable to  
20 have NIOSH summarize what's on the table,  
21 bring that back to the work group, let the  
22 work group look at that and then decide upon a  
23 course of action.

24 **DR. ROESSLER (by Telephone):** I like that  
25 suggestion because I've seen from other

1 situations where if something doesn't seem to  
2 be completely resolved, it pops up again. I  
3 think it would be well for the work group to  
4 ask NIOSH to do this and really try to bring  
5 it to completion.

6 **DR. WADE:** Is that understood here?

7 **DR. ROESSLER (by Telephone):** Do other work  
8 group members feel that's a good approach?

9 **DR. WADE:** We've got two, three head nods.

10 **MR. GUIDO:** Can I ask something? In doing  
11 that could we ask or could you guys also ask  
12 if we could take a look at that interview a  
13 little, you know, to pull a thread on the  
14 interview and see if the individual who  
15 recollected this, you know, about the  
16 timeframe. In other words maybe you can kind  
17 of pursue or is it possible that we're talking  
18 about the late '40s timeframe as opposed to  
19 the late '50s.

20 **DR. OSTROW:** Would you like us to revisit  
21 the original interview --

22 **MR. GUIDO:** Yeah, does that sound  
23 reasonable?

24 **DR. WADE:** I think that would be very  
25 reasonable. As part of this sort of getting

1 all the facts, explored and put together in a  
2 document and then brought to the work group.

3 **DR. OSTROW:** You're going to prepare the  
4 main document, and we'll try to find our --

5 **MR. GUIDO:** We could coordinate.

6 **DR. OSTROW:** -- to include in the whole  
7 document.

8 **MR. GUIDO:** Yeah, I mean, I'd be willing to  
9 coordinate with you, just one document versus  
10 two documents. We could kind of produce one  
11 summary.

12 **DR. WADE:** So to follow the classic approach  
13 of the work group, there could be a technical  
14 call that would take place between NIOSH and  
15 SC&A where these issues would be discussed and  
16 a document would result that would be brought  
17 back to the work group. If such a call takes  
18 place, John, following our normal procedures,  
19 would you let the work group know of that call  
20 so that work group members could listen if  
21 they would like?

22 And then you would produce a summary  
23 record of the call and then a document would  
24 be forthcoming that would come back to the  
25 work group. I think it's worth it. In my

1 view there's been excellent quality work done  
2 all around this issue. The thing to do is  
3 collect it, put it together and then let  
4 reasonable people look at it and draw their  
5 conclusions.

6 **DR. LOCKEY:** Jim Lockey. Do you also  
7 include what was standard practice in the  
8 industry during that time like at other sites  
9 in relationship to recycling or recovering?

10 **DR. MAURO:** Would you like that to be done  
11 by NIOSH or SC&A or both?

12 **DR. NETON:** We can do that. We already have  
13 the documentation on that for Bethlehem Steel.  
14 We've already gone through and evaluated the  
15 recycle program as they called it back in that  
16 time period, a formal program initiated by the  
17 AEC.

18 **DR. WADE:** I think any of the issues that  
19 have been raised, you should try to the degree  
20 possible to explore and summarize. Again, I  
21 know that everybody is busy and has lots to  
22 do, but this is an issue that is best looked  
23 at completely now in an attempt to be laid to  
24 rest, otherwise we'll be revisiting it and  
25 spend more time than it would take to do it

1 right now.

2 DR. OSTROW: Okay, sounds good.

3 OUTDOOR SOURCES OF RADIATION

4 DR. WADE: And that's 17. We're on to 22.

5 DR. OSTROW: We're getting there.

6 MR. GUIDO: I think this refers back to 17,  
7 so I think we're...

8 DR. OSTROW: Okay, let me just see what  
9 22... Okay, yeah, I was just reading our  
10 comment 22 which was on the whether NIOSH  
11 accounted for all outdoor sources of  
12 radiation. And this basically says that to  
13 comment 17 that we just did, so I think  
14 whatever we do on 17, we also answer 22. So  
15 we had tied the two together, and they'll both  
16 be resolved together, 17 and 22.

17 DR. WADE: Is that the end of the list?

18 DR. OSTROW: Yep, that's the end of the  
19 list.

20 WRAP-UP

21 DR. WADE: Gen, it's back to you. You've  
22 been through all the items and we have one, I  
23 think we've taken those and left one  
24 outstanding action item which is a technical  
25 call between the parties on this issue of the

1 burlap bags and surrounding issues. I don't  
2 know if you want to explore a timeline for  
3 that call or how you would like to proceed.  
4 Any sense of when a call like that might take  
5 place and be most fruitful?

6 **DR. ROESSLER (by Telephone):** I think it  
7 would be good, we have a few minutes left,  
8 while everybody's there to try and pick a time  
9 to do the call and make sure that NIOSH and,  
10 especially NIOSH, has a chance to do what  
11 we've asked them to do.

12 Any suggestions?

13 **DR. OSTROW:** I suggest what we do is once we  
14 get back to our offices and look at the stuff  
15 that we have, you know, back and forth and  
16 just, this way we can see how much work it's  
17 going to be for both organizations and can  
18 have a timeline then.

19 **DR. WADE:** When you said get back to your  
20 room, you mean in this hotel?

21 **DR. OSTROW:** Back to the offices.

22 **DR. WADE:** I didn't know if you have an  
23 answer the end of the week or not.

24 **DR. OSTROW:** So we'll have a timeline by, I  
25 guess, next week.

1           **MR. GUIDO:** That sounds good. I'm not sure  
2 of the stuff, the recycling stuff. Is that  
3 put together in a form we can --

4           **DR. NETON:** There are documents out there.  
5 We're going to have to summarize them a little  
6 better, but we can get it.

7           **DR. WADE:** Gen, what they're saying is they  
8 want to go back to their caves and sort of  
9 look at what they've got there and then the  
10 beginning of the week put their heads together  
11 and suggest a timeframe for the call to you  
12 early next week, make a suggestion of the  
13 timeframe for the call early next week.

14           **DR. ROESSLER (by Telephone):** So who's  
15 taking the lead on this?

16           **DR. OSTROW:** Joe from NIOSH and Steve from  
17 SC&A.

18           **DR. ROESSLER (by Telephone):** Okay, so  
19 you're going to put your heads together and  
20 come up with the suggested time.

21           **DR. OSTROW:** Yes, we will.

22           **DR. ROESSLER (by Telephone):** And then let  
23 everybody know.

24           **DR. OSTROW:** That's exactly.

25           **DR. ROESSLER (by Telephone):** Okay, what



1 about Jim and Josie and Mike? Does this sound  
2 good for you?

3 **MS. BEACH:** Yes.

4 **DR. LOCKEY:** It's fine, yes.

5 **DR. ROESSLER (by Telephone):** Okay, then I  
6 think we've reached the end of our meeting  
7 unless there's something else that you can  
8 think of.

9 **DR. WADE:** No, but I would like to commend  
10 all parties, particularly the technical  
11 principals, I mean, if there was to be a model  
12 of how the process should work, this would be  
13 it in my opinion. So my compliments to all of  
14 you. You still have work to do but the work  
15 from my perspective is excellent, so thank  
16 you.

17 **DR. ROESSLER (by Telephone):** Gee, then, are  
18 we finished?

19 **DR. WADE:** We can be if you like.

20 **DR. ROESSLER (by Telephone):** All right,  
21 thank you to everybody, to Steve and Joe  
22 especially, and to the work group.

23 **DR. WADE:** So all Board members are off the  
24 clock.

25 (Whereupon, the working group adjourned at 9:30 a.m.)

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**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. 08, 2008; I, Steven Ray Green, then transcribed the proceedings, 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 29th day of Jan., 2008.

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