The verbatim transcript of the Working Group Meeting of the Advisory Board on Radiation and Worker Health held in Cincinnati, Ohio on March 26, 2007.
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TRANSCRIPT LEGEND

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

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

DR. LEWIS WADE, DFO

DR. WADE: This is Lew Wade. I have the privilege of being a designated federal official for the Advisory Board, and this is a meeting of the work group on the Linde site profile of that Advisory Board. This work group is chaired by Gen Roessler. Josie Beach, Dr. Lockey and Mr. Gibson are members of the work group. They’re all here and present in the room.

Let me start by asking if there are any other Board members who are connected to this meeting by telephone.

(no response)

DR. WADE: Are there any Board members connected by telephone?

(no response)

DR. WADE: Okay, so I judge we don’t have a quorum of the Board; and therefore, we can
continue with our deliberations. What I’ll do is go through some introductions. We’ll start with the people around the table. Then I’ll ask for other members of the NIOSH/ORAU team to identify themselves, other members of the SC&A team to identify themselves.

I’ll then ask for other federal employees who are on the call by virtue of their employment. I’ll ask if there are members of Congress, their staff, workers or worker representatives that are on the call. I’ll then ask that anyone who wishes to be identified, do that. And then before we begin the deliberations, I’ll give you a little talk about phone etiquette and things we should try to avoid.

So let’s begin by going around the table. I will also ask that for members of the Board, SC&A, ORAU and the NIOSH people who identify if they have any conflicts relative to the Linde site.

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

**DR. NETON:** This is Jim Neton. I work for NIOSH, and I am not conflicted at Linde.
MS. HOWELL: Emily Howell with HHS, no conflicts.


DR. ROESSLER: Gen Roessler, Advisory Board, no conflicts.

MR. GIBSON: Mike Gibson, Advisory Board, no conflicts.

MS. HOFF: Jennifer Hoff, ORAU team, no conflicts.

MR. CRAWFORD: Chris Crawford with NIOSH OCAS and no conflicts.

MS. BEACH: Josie Beach, member of the Board, no conflicts.

DR. LOCKEY: Jim Lockey, Board member, no conflicts.

MR. ELLIOTT: Larry Elliott, I work with NIOSH. I have no conflicts.

DR. WADE: Now let’s go out to those on the telephone. We’ll start with members of the NIOSH/ORAU team.
MS. BLOOM:  Cindy Bloom, no conflicts.

DR. WADE:  Other members of the NIOSH/ORAU team?

(no response)

DR. WADE:  Members of the SC&A team?

MR. CHAN:  Desmond Chan, no conflict.

DR. MAKHJANI (by Telephone):  Arjun Makhijani, no conflicts.

DR. WADE:  Hello, Arjun.

Other members of the SC&A team?

(no response)

DR. WADE:  Other federal employees who are on the call by virtue of their employment?

MR. KOTSCH (by Telephone):  This is Jeff Kotsch, Department of Labor.

DR. WADE:  Hi, Jeff, as always welcome. I’m asking for members of federal employees who are on the call by virtue of their employment.

MS. CHANG (by Telephone):  Chia-Chia Chang with NIOSH.

DR. WADE:  Hi, Chia-Chia.

Any other?

(no response)

DR. WADE:  I’ve also already asked for
NIOSH/ORAU team and SC&A team. I’m going to move now to members of Congress, their staff, workers or worker representatives.

(no response)

DR. WADE: Anybody on the call who wishes to be identified that hasn’t already identified?

(no response)

DR. WADE: Okay, before we begin I’d ask you to use common sense in terms of your connection by telephone. If you’re not speaking, then mute your phone. If you are speaking, speak into a handset as opposed to using a conference call. There’s all kinds of background. Be mindful of background noises. Again, we want to use conference calls. It facilitates the Board’s work, but if there are poor etiquette practiced, it can be difficult for us to do this. So think about background noises. Think about what you’re doing, and we’ll begin.

Gen?

INTRODUCTION BY CHAIR

DR. ROESSLER: So we’re meeting to go through the issue resolution matrix for the Linde findings. The first thing I’d mention
is that we did get this, the SC&A findings, the NIOSH response. We received a copy from Chris which was a little difficult to read for those of us who have reading glasses. The font was kind of small.

Steve actually took that and put it in a bigger font. I hadn’t asked him to do it, but I appreciate it. And it’s in a landscape form so if anybody needs this extra little help in looking at it, I did make another copy. I’ve got just one. I wonder if there’s another copy for Mike to look at.

So on the SC&A team we have Steve Ostrow who’s working with us, and the NIOSH person is Chris Crawford. Typically, in these work group meetings we go through the matrix step-by-step. I would like to propose doing this a little differently. I’m not feeling real strongly about it, but Steve had sent to me a list -- I had asked him for the most significant issues that SC&A found. And he sent me a copy of that, and I sent them to the work group. I’m not sure if Mike got his.

And I was wondering if it would be more efficient to go through it from that
point of view, not actually step-by-step through the matrix but deal with the significant issues. And I can call those out as we go. Those significant issues I think are also in your review of the site profile, aren’t they?

DR. OSTROW: Maybe not. Gen, I’d like to change it a little bit here. We had sent you the significant issues I think like last Tuesday before we had the NIOSH response, which means there is a difference. And after spending the weekend looking at the two of them, some of the significant issues we sent you, I don’t think are that significant any more.

DR. ROESSLER: Well, that’s good.

DR. OSTROW: I think we’d like to do a little bit of what you propose, and we have a few significant issues that we’d like to discuss first, and maybe then go through the 22 comments we have. Some of them are not too important after reviewing things. Just a few of them have actually some importance, and a number of them are quite redundant. So I think we’d like to proceed in a little bit
different order than what we had sent you.

**DR. ROESSLER:** So what you’re suggesting is out of the list of significant issues you sent around to the work group that you now have a different list, a shorter list, of significant issues. So perhaps the approach, if this is okay with Chris and the rest of the work group, would be to for you to say here’s the issue we want to discuss first.

**DR. OSTROW:** Yeah, I think so. I’d like to give a little introduction which will be very brief, what we see as some significant things. Then I think we could go through the individual issues fairly quickly. Most of them are sort of either short discussion or no never mind and just concentrate on the couple that are of more significance.

**DR. ROESSLER:** So to do this you would take the matrix then, point out the issue so we could all look at it and follow through on that.

Now how do you feel about this, Chris and Jim? Would this be an appropriate --

**DR. OSTROW:** We’ll cover everything in the matrix but --
DR. WADE: If I can ask you just to speak up a little bit if you could.

DR. ROESSLER: Okay, so --

DR. MAKHIJANI (by Telephone): This is Arjun. This is Arjun. Steve, did you get my e-mail on the weekend?

DR. OSTROW: Yeah, I got it with my, I looked at it just before I went to bed actually. Yeah.

DR. MAKHIJANI (by Telephone): Okay, so I guess you’ll factor that list in as you feel appropriate?

DR. OSTROW: I will. If I miss anything, please jump in.

DR. MAKHIJANI (by Telephone): Okay, great. Thanks.

DR. ROESSLER: Okay, so go ahead and take the (unintelligible).

INTRODUCTION BY DR. OSTROW

DR. OSTROW: I just want to say that I was the lead reviewer on the Linde profile for SC&A. And the other person who did a lot of the work, Desmond Chan, is on the telephone line also and Desmond should jump in also if necessary.
The first thing I’d like to say is that in reviewing our comments in the actual full report and in the issue resolution matrix, I must say I have to apologize a little bit to NIOSH and ORAU that our language was a little bit overblown in a couple of cases where we used some language as a little bit intemperate, and we criticized maybe too much. And please forgive us.

You know, this was after reading and re-reading and re-reading, we got a little bit tired of reading, you know, and after awhile got a little bit testy in some of the comments. So don’t take it too personally some of our comments.

DR. WADE: I hope you learned from that experience and won’t do that again.

DR. OSTROW: That’s right. We’ll tone it down a little bit.

The way I read it is that for the internal dose is the main area that we’re concerned with in this. And the way I read it is that we started out, ORAU started out with air concentration data which was taken primarily from the AEC report, New York
Operations office, 1949 report. And this is the basis for the data which we have a copy of if you have to refer to it.

That’s “Health Hazards in NYOO Facilities Producing and Processing Uranium Status Report”, April 1st, 1949, in which the – I guess it was the AEC New York Operations Office looked at various uranium processing plants in New York state and looked at the Health Physics. I think there were seven plants and Linde was one of them.

This formed the basis of the internal dose based on measurements that were taken at Linde. The maximum value for airborne concentration was 33 MAC which is found for Linde. I was looking at some data and that air concentration data was then used for internal dose in the ORAU calculations. And the internal dose consisted of two parts, inhalation and ingestion. So it was used for an inhalation and ingestion.

Now some of the questions we’ve had, first of all we looked at, since everything is based, or a lot of it’s based on this 33 MAC assumption, is that a good assumption to start
with? Is 33 MAC really a limiting value of the site?

**MS. BLOOM (by Telephone):** John, this is Cindy Bloom, and since this first came out which we were on a tight schedule, we’ve assembled the internal dosimetry data that would better relate to the issue. And I guess from where I sit, I would propose we go back and analyze that data. We have a little over 700 uranium bioassay results, urinalysis results that we can use to develop the internal intakes a little bit better I think.

**DR. OSTROW:** Okay, so you’re saying that you’re going to be re-looking at the internal dose using this bioassay data that you have now?

**MS. BLOOM (by Telephone):** Correct, with NIOSH’s permission and approval.

**DR. MAKHIJANI (by Telephone):** Cindy, this is Arjun. Does the bioassay data span the different production periods, you know, the African ores, the U.S. ores, and just concentrates, so on?

**MS. BLOOM (by Telephone):** Arjun, there is an SEC that goes through October 31st, 1946 --

MS. BLOOM (by Telephone): --and there was no African ore production during the production periods after that time. They started with U-02 concentrates.

DR. MAKHIJANI (by Telephone): Oh, okay, thank you, thank you. Yeah, I’d forgotten that.

MS. BLOOM (by Telephone): So the bioassay actually that we have right now is from the end of 1947 through the very beginning of 1950.

DR. MAKHIJANI (by Telephone): Thank you, thank you for clarifying that. I had forgotten that.

MS. BLOOM (by Telephone): You’re welcome.

DR. ROESSLER: Steve, are you giving us background now? Are you dealing with a particular issue --

DR. OSTROW: I’m just giving you two more minutes of background so you can see where we’re coming from, then we can talk about issues.

DR. ROESSLER: Okay.

DR. OSTROW: So anyway, so some questions,
first, as I said is the 33 MAC a good number? Is it really, because if it really is a limiting value, some of our comments go away. Two, can you legitimately estimate airborne concentrations, are the inhalation doses from the air concentration data in the uranium facility? We have some questions about that. How widely you can relate the two.

And three --

**MS. BLOOM (by Telephone):** I’m sorry. I didn’t hear two. There’s a cell phone it sounds like on this line.

**DR. OSTROW:** I think two was can you reliably estimate inhalation doses from airborne concentrations in a uranium facility? And three is the ingestion thing. It was assumed that the ingestion is 0.2, 20 percent of the inhalation. Is that a good, valid procedure to take also?

So this is all like a sequence of things to look at for the internal dose. That’s basically where we’re coming from. So I think I would go through our specific comments. A number of them are redundant, and
a number of them deal with these issues.

And a number of them we looked at over the weekend and decided aren’t too important. So I think we can start like at issue number one, just run through, and the ones that aren’t important we can get rid of quickly.

Sound okay with everyone?

DR. ROESSLER: Sound okay, Chris?

MR. CRAWFORD: Yes.

**ISSUE ONE**

DR. OSTROW: Number one, this is where I, one of the things I apologize for. I criticized too much maybe the way it was done. And NIOSH said my comment’s too general and all that and so forth. This is what we criticized basically that there were unsupported assumptions and significant uncertainties in the information used.

Well, maybe that’s overstating it. We do have some comments though on some specific issues. For example, whether -- this is sort of general. Were all the contaminated areas taken care of. For example, when we did interviews with the workers up in the Buffalo area after we started doing our review, the
workers seemed to think there were more contaminated buildings and areas than were identified in the site profile. Whether these were important or not, the workers seemed to think there were more areas than that.

There was also the issue, which I don’t know if it was mentioned in the site profile. I didn’t find it. But if tunnels, apparently, there are all sorts of utility tunnels that ran under the buildings, and the workers have been giving stories about how, especially when it rained and this that and the other thing, the water would be dripping down. And if the buildings were contaminated, then the water in the tunnels would be contaminated. And I don’t know if this was looked at or not or if this really happened or not. These are recollections and 50 years ago.

The workers mentioned various piles of radioactive stuff, water and other things outdoors. I know the report mentioned a few places that you had looked at piles of radioactive stuff outdoors. But this is just a question of whether, you know, how deeply
you looked. Did you include everything that
you could find in that? Are there other
things?

And one of the issues that came up a
little bit later that we actually pulled out
separately, the burlap bag business, which you
did mention in your report, but apparently
there were tens of thousands of burlap bags.
These are the ones that were used to hold
uranium, uranium rods and ore, arrived in rail
cars and workers pulled the stuff off in 50
 pound burlap bags.

When the bags were empty, they stacked
the bags up in piles, and the workers
recollect sitting and eating lunch on them
because they were nice and comfortable
outdoors. And I know the bags were supposedly
empty, but since it’s burlap, and they’ve got
a lot of uranium dust, they probably had some
activity which may be small for one bag, but
if you’ve got lots of bags and your sitting on
it, maybe that’s an important contributor,
maybe yes, maybe no. That’s something to look
at.

So that’s issue one. There’s nothing
to resolve, really, in issue one. It’s just a question of taking a look at some more things. Oh, and one other thing that Arjun had brought up in his e-mail that he sent last night, the burlap bags were eventually burned, I think, or incinerated.

Now I didn’t see any mention in the TBD of an incinerator and which either means that there was one, maybe there wasn’t one onsite. But somewhere they incinerated all these bags, and I’m not sure where they incinerated them.

**MS. BLOOM (by Telephone):** There were two different periods of time, John. There was burning of the bags. There was an incinerator. I found a reference that mentioned it in 19, the earlier 1940s. Also, those were the ore bags that were referred to. And remember again that there’s an SEC based on the internal exposures during the earlier years. And so we’re looking at November 1947 forward for internal exposure from whatever might have been on site at that point.

**MR. CHAN: (by Telephone):** Cindy, this is Desmond Chan. When we talked to the workers,
they actually were talking about there’s thousands of bags after the ‘50s. They’re still sitting behind building 30s in the bay area when they have other trucks coming in and out. And they’re piling up there. They probably are just sitting there for like a few years before they are moved away or incinerated or burned. So I think that is what we are so concerned about.

MS. BLOOM (by Telephone): I think we probably all need to go back and look at the references and see what’s there because I do, I have seen references to piles of bags sitting onsite. I do see information that indicates that procedures changed over time. But at this point I’m not willing to --

MR. CHAN (by Telephone): I understand, yeah, we’ll just point out that there’s some concern there.

MS. BLOOM (by Telephone): Right.

DR. MAURO: This is John Mauro. I’d like to also add maybe it’s more about a policy question. I understand there is a break point between the SEC period and a non-SEC period. But nevertheless, the matrix for doing dose
reconstruction there are the non-presumptive cancers that still need to be dealt with. And so I would imagine that the technical issues that we may have that may apply or be of concern during the, I guess, what’s it? Pre-1947 or (phone interference) time period. The SEC (phone interference). We’re still interested in that, and I believe it’s valid to address issues, even though they aren’t in the SEC period.

**Dr. Neton:** We have to look at the definition that the SEC has and what reasons the SEC was granted, for example, that says we just have no knowledge of reconstructing four doses because there’s no data, then when it comes to reconstructing non-presumptives we would say can’t do it.

**Dr. Wade:** But you should raise your technical issues. They need to be looked at in light of the SEC definition to see if we really need to dismiss the issue because the SEC definition says we can’t, we haven’t learned anything about that. Or if it doesn’t, then it might relate to the non-presumptive cancer. So you should raise your
issues.

DR. NETON: In fact, the only revision to, that I see in this TIB or this site profile was PC-1, which was issued to incorporate. We’ve gone through the site profile and modified it to deal with non-presumptive cancers. Or modified to incorporate the comments that were raised in the SEC that kind of said what we can and cannot do in this document. Good point.

DR. ROESSLER: So then going back to Steven mentioning the burlap bags. Should that be dealt with here or that’s issue number 17? Did you want to pursue it --

DR. OSTROW: I think we did deal. I think that’s it for the burlap bags. I think it’s basically that they may have been an issue from the early days on through the 1950s. And basically we have to check and see how they were handled, you know, whether they were significant or not significant.

DR. ROESSLER: So are we actually discussing issue 17 now is my question.

DR. OSTROW: Yeah, I think so.

DR. ROESSLER: I think we kind of jumped --
DR. OSTROW: Bounced around, didn’t we?

DR. ROESSLER: Yeah.

DR. OSTROW: Good, we finished 17. That’s enough.

DR. ROESSLER: I just want to make sure. I don’t have anything to write here. What did we say about 17? What’s the conclusion on it and what, is there an action item for NIOSH on it?

DR. OSTROW: Yeah, I think 17’s done. And I think the action item, well, it’s two action items. One’s for NIOSH to research the burlap bag issue, take a look at their documentation --

MS. BLOOM (by Telephone): Excuse me. Item, issue 17 is related to external exposure. It’s not related to internal exposure.

DR. OSTROW: Yeah, yeah, 17’s external.

MS. BLOOM (by Telephone): I think then your idea of picking an approach and sticking with it is probably a good one until we capture the issues that are important and don’t bounce all over the place.

DR. OSTROW: Okay, I’ll try not to bounce too much.
**MS. BEACH:** Well, and I have an issue with it being just external because if you’re sitting on thousands of bags during lunch and break and someone flops down next to me, can I be contaminated by that? Or can I get some internal? So I think that needs to be explored to what, it says lightly contaminated, but what does that mean? And it says for years so --

**MS. BLOOM (by Telephone):** There are two different issues. There are the ore bags that came in prior to 1947 when the SEC was established, is now established. So those are in the SEC periods, and we’ve said we cannot reconstruct that dose. Now there’s an allegation that burlap bags were still sitting around during that later period.

And the answer to that is we need to look into that further. We haven’t seen evidence of that in the documentation that we’ve looked at. They were handling waste a little bit more efficiently it looked like to us when we reviewed the records. But we need to look into that for the internal issue after 1947.
DR. ROESSLER: So is that both an internal and an external?

MS. BLOOM (by Telephone): Right, but issue 17 in the matrix is only external.

DR. OSTROW: That’s true.

MS. BLOOM (by Telephone): There’s another issue somewhere before that on internal from the bags.

DR. OSTROW: Okay.

DR. ROESSLER: Can you print that out so we know where we’re --

DR. OSTROW: What issue is this?

DR. ROESSLER: So we can sort of follow through on these and make sure we don’t lose something.

MS. BLOOM (by Telephone): Or just in general on the internal ones. So I guess in general I would go back and say that this has to do with going back and looking. We now have bioassay data to go back and use. So we would capture it that way.

DR. LOCKEY: You’re talking about issue 17? This is Jim Lockey.

MS. BLOOM (by Telephone): Issue 17 when I read the NIOSH report appeared to be looking
primarily at external dose issues. On the internal dose issue we would look at that, and that’s really summarized sort of by issue two, I guess, the use of air concentration data. We would go back and look at the bioassay data which would include consideration of the internal dose from the burlap bags, the folks who had bioassay.

DR. ROESSLER: So it appears we’re now talking about issue two and issue three because Cindy’s bringing up the urinalysis data that would be used apparently in lieu of doing the air concentration. Is that where we’re at?

MS. BLOOM (by Telephone): We would look at both sets of data, Gen, but probably the urinalysis data would win out as you point out.

DR. ROESSLER: It seems like that may be the most important issue on the table right now is to evaluate that. Would that be what you think, Steve?

DR. OSTROW: Yes, it comes with both internal and external of the burlap bags and what you would affect the air concentration
data if you sit on the bags and would have to
get dust in the air and breathe it in and
ingest it if you’re eating lunch.

MR. CRAWFORD: Is that likely to exceed the
33 MAC?

DR. MAURO: I think that --

DR. OSTROW: Probably not, maybe not but --

DR. MAURO: Let’s work our way down and as
the original plan. Work our way through and
the ones that we can do quickly, we do
quickly. And the ones we have to stay on, we
stay on. Otherwise, we’re going to lose
control.

ISSUE TWO

DR. OSTROW: Okay, issue two. This is the
issue of air concentration data. As I
mentioned before, how valid is it to use the
air concentration data as the estimate for
internal dose estimation, as the basis for
internal dose estimation?

John, I think you had something to say
about that? Do you want to report on this?

DR. MAURO: Well, it turns out I’ve been
looking at a lot of the air data for all the
AWE facilities on Chapman Valve, and Dow and
across the board. And the data -- now, as I understand it, the 33 MAC, I guess the bottom line is that we have some criticism of 33 MAC that to a certain extent I want to buffer down a bit.

As I understand it, the work done by the New York Operations Office in 1949, they took a number of measurements, a large number of measurements, for Linde. And they did come up with it looked like time-weighted averages for different operations. And the highest daily time-weighted average amongst the whole bunch that they saw was 33 MAC.

Now I walk away from that saying that’s pretty good. One of my concerns has always been if I have a number of air measurements, each one’s a time-weighted average representing a different type operation, and I have a bunch of workers, I’m not quite sure where they worked, but they did, in my opinion, you pick the highest time-weighted average because that’s your, would be a plausible upper bound. So I walk away saying that’s a pretty good number.

And we have some criticisms here that
there should be some uncertainty. I think in re-thinking this, you know, if you pick 33 MAC as a plausible upper bound, you don’t really have to assign uncertainty because you’ve picked an upper bound, but it’s a plausible upper bound. So I’m not saying it’s off the charts, but it’s up there.

The only thing that I walked away with that said I still have some concern is that it’s not apparent when I read the NYOO report that the 33 MAC was obtained from breathing zone samples or from general air samples. My experience is that the relationship between intake and general air samples is pretty poor. There’s lots of literature on that. But the relationship between breathing zone samples and intake is a lot better.

So my question to you -- I guess it’s a layered question. One is if you were, in fact, going to base your model, your exposure matrix, on 33 MAC for inhalation of uranium -- we haven’t even talked about the other radionuclides -- on first blush I would say it’s a good number, but I would like to hear a little bit more about the degree to which that
33 MAC was obtained from general air samples
or from breathing zone samples.

And I guess that’s my question. You
may have an answer to that, but on top of that
it sounds like you did one better. It sounds
like you’ve got a lot of bioassay data. Now
if you’ve got 700 bioassay data samples that
go back to the full time periods of concern,
well now you’ve struck gold. And you can say
a lot about what the intakes were.

You’re in a position to validate the
33 MAC so it becomes a very important data
source to support. It sounds like it’s being
done because of the SEC, but that’s extremely
valuable. But item number two simply boils
down to I’d like to hear a little bit more
about the 33 MAC and whether or not you think
that represents the breathing zone sample or
is that something that comes from general air
samples.

DR. BEHLING: So can I ask a couple
questions about the particular measurement?
This was a time-weighted average for, I
assume, an entire shift for all the different
workers. And was this part of an audit that
was announced? And sometimes that’s a very
critical thing if this was like an audit by
NYOO, people tend to clean up their act for
the duration of the audit. All of a sudden
people wear respirators. They are mindful of
certain things. They’re being watched, and
the question is if that particular measurement
--

And I’m not questioning the validity
of that time-weighted value, but if this was
done as part of a scheduled and known audit by
the NYOO. One also has to look at it in the
context with everyday, normal operation that
may have been (inaudible). The conduct of
workers is somewhat different.

MR. CRAWFORD: I think the respirator issue,
while probably true, people would tend to wear
them while inspectors were present, probably
isn’t relevant for the measurement, however,
of the air concentrations.

DR. BEHLING: Well, yes and no. For
instance, I’m looking at some key things that
maybe I missed here in discussing, but I’m
looking at some documents involving Fernald.
And there’s a right way to do something, and
there’s a wrong way.

And one of the funny things was people were asked to transfer certain amounts of material including uranium from one location to another. And the operator was identified as saying if I do it very carefully, this is what general air sample data concentration would yield, and again, it’s an empirical measurement.

And if I do it modestly carefully, this is what it’ll do. And if I’m in a very hurry because of production quotas that are pushing at my back, I’m going to do it very recklessly. So yes and no. It’s air sampling, but air sampling done under different conditions of motivation by the worker.

**MS. BLOOM (by Telephone):** Just to, in general at this period in time, the AEC was coming in to see what was going on. It wasn’t really considered an audit in terms of we’re going to beat you up if you’re not doing well enough or if you’re not following the rules. We want to collect information.

In general, they would collect
breathing zone samples, general area samples
and sometimes process samples which tend to be
even higher than the breathing zone samples.
I think that we’ve stated that we’re going to
go back and look at the bioassay samples so I
think a lot of this is moot.

But I also think that you mentioned
use of respirators. And I think you need to
remember that this was a chemical operation
involving hydrochloric acid. Hence, that
should maybe color how much you think people
were wearing respirators or not. I do think
they were a little bit more likely in this
kind of operation to be wearing their
respirators. Certainly, the people who were
the chemical operators --

DR. ROESSLER: Cindy, are you saying that
you have bioassay samples during the period of
time under discussion so you could validate
that 33?

MS. BLOOM (by Telephone): Right, we’re
going to go back and look at a coworker study.
We’re not intending to either validate or
reject the 33 MAC. That was our first
approach at trying to come up with a way to
speed along the dose reconstructions. But we’ve now got this other data that we feel is more representative of what workers were actually exposed to.

So we’re going to look at that and assuming that it is a valid set of data that covers a great enough period of time, we’re going to substitute that, which doesn’t mean we’re going to lose that air sample data because that’s good to know as well, but the reliance is going to be on the bioassay data as it has been for most every site profile where we can find bioassay data that’s applicable.

Does that make sense?

DR. BEHLING: Does the bioassay data include isotopic evaluation or is it basically photofluorometric that just gives you units of uranium per liter? Based on the fact that we’re also dealing with Belgian Congo pitch blend, what kind of bioassay data do we have?

MS. BLOOM (by Telephone): Once again I need to say that they were not processing ore as of 1947, November, 1947. They were starting with U-02. This is uranium urinalysis data. We do
have some radon breath analysis from 1944 and
1945 that could be used to estimate an upper
bound on radium intakes, but I don’t think
that’s an important point because we’re moving
forward from 1947.

Now I think as we move down the matrix
when we talk about other radionuclides there
may be an issue there. But I think we should
hold off until we get to that place. Right
now I’m just talking about uranium intakes.

**DR. MAURO:** This is John Mauro again. Just
to help everyone around the table, this
special study that was done by the New York
Operational Office, they actually, it was only
performed over a one-week period according to
the data, to Linde. And they broke up the
different types of operations into 21 separate
different operations. And the one that by far
had the highest time-weighted average was one
particular called Group B and C operations
which had the 33 MAC.

So my first reaction to that was,
well, of all the different types of
activities, certainly, all the workers weren’t
involved. To assume every worker that was
there experienced a 33 MAC seems to be a reasonable, plausible bounding assumption. And now this dataset by the way not only for Linde but the other seven facilities, which include Harshaw and several others, they become a very important rock that all of the AWE work is standing on. And the fact that you now have bioassay data that goes along with this, you’ve found a holy grail.

In other words in my opinion a comprehensive evaluation of the validity of using time average, whether these are breathing zone or not I’m not sure, but let’s assume they were, data as the rock you’re standing on because by the way that’s where OTIB-4 comes in. It’s an extremely important document. This particular dataset now is going to validate the use of these air sampling data as a plausible upper bound. So I’m very happy to hear this, and I think it looks like, Jim, you’re excited about doing this.

**DR. NETON:** Yeah, yeah.

**DR. LOCKEY:** John, how many samples were there in that database?
DR. MAURO: I’m looking at the columns and out of those 21 the highest one that looks like there was 15 samples. The second highest there were three. The third -- so we’re talking a total of, I would just guesstimate from eyeballing this table it looks like over 100.

DR. LOCKEY: A hundred samples.

DR. MAURO: Over 100 air samples.

DR. LOCKEY: And most of them are clustered around what? What was the results?

DR. MAURO: They range from a MAC of less than one.

DR. OSTROW: Most of them are less than one.

DR. MAURO: In fact most of, it turns out interestingly there was that preferred level, the 70 MAC.

DR. NETON: Seventy DPM.

DR. MAURO: Seventy DPM, right, right. So one MAC it looks like most of them, the vast majority of them were below one MAC, the preferred level. But there were a total of 18 out of the 100 or so that were above one MAC. And the worst one was, the worst cluster of 15, was one particular operation, the Group B
and C Operations it’s called, that was the highest one amongst, that was 33 MAC. And so someone to say in Linde operations if you happen to be working in Group B and C, your reasonable estimate for you would probably be on the order of 32 MAC. That appears to be the worst case, with the proviso that this was breathing zone. If it wasn’t breathing zone but included a lot of general air samples, then you could question it.

**DR. NETON:** Well, we’ve been through this method before at Bethlehem Steel, and it’s really, like Cindy said, a combination of breathing zone when the workers were actually doing a process. But when they take a break, and they go into a locker room, for example, they’ll use a general area sample which I think is fairly representative of the area. It’s not subject to the drop off in concentration as you move away from the exact source because you’re fairly far, the general area samples were fairly far removed from the source of the generators.

**DR. MAURO:** So by definition when I hear
there is a time-weighted average, because that’s how they represented here, you could safely presume that means a combination --

**DR. NETON:** And that methodology has been, we provided that before to you guys.

**DR. ROESSLER:** So does that mean that this new dataset and the new evaluation that they’re going to do that we have taken care of a number of issues? I’m interested in getting through the numbers here.

**DR. LOCKEY:** It’s a very valuable dataset if you can correlate it with the internal dose issue, and you’re dealing, most of yours are under one MAC, but you’ve got some extremes there, and you should be able to correlate that with your internal dose.

**DR. MAURO:** To answer your question, Gen, it deals with the uranium side of the house, not the thorium, raffinates, those are going to be tough nuts to crack, and we’ll get to those.

**DR. ROESSLER:** So looking at the matrix then, how far down have we moved? Have we actually gone through issue six? Certainly, we’ve been concentrating on two and three. It appears that we’ve talked about the time-
weighted averages in issue four. We talked about breathing rate, which you said, and the ingestion rate. It seems to me we’ve covered through six.

**DR. MAURO:** I think, you know, six.

Jim, correct me if I’m wrong. The method used in issue number six, the dealing with ingestion?

**DR. NETON:** Right.

**DR. MAURO:** That was the old .2 rule of thumb.

**DR. NETON:** OTIB-9.

**DR. MAURO:** And now from reading recently I read the updated Bethlehem Steel site profile. It looks like you’ve come up with a correlation between activity --

**DR. NETON:** We did that for Bethlehem Steel because we had some of the Simond’s Saw and Steel information, but we still are committed to revisiting that model and coming up with at least validating the .2 or coming up with a different approach. I think if we use urinalysis data, the ingestion goes away because then you can either assume it was all ingestion or all inhalation and --
MR. ELLIOTT: That model being TIB-9 or the Bethlehem Steel exposure model? I’m sorry, you said that model, lost me.

DR. NETON: TIB-9. Bethlehem Steel was a unique situation where we found, we used Simond’s Saw and Steel data to sort of, and surface contamination data, remember we had that whole discussion. And we included that in the Bethlehem Steel site profile. And SC&A’s position at that time was, well, this sounds really good in principle, and you have some data you could use there. But you weren’t convinced that it was generally applicable complex wide. So we still owe that piece which is a TIB-9 re-evaluation. But again, if we go to urinalysis data then the ingestion rate goes away because we’re not inferring any ingestion rate any more. We’re using what’s coming out in the urine to determine --

MS. BEACH: And that would take care of number five, the breathing rate that was in question --

DR. NETON: Yes, all those issues go away if we have a valid coworker model.
DR. ROESSLER: So basically we have looked at internal uranium, we promised to look at the bioassay data and come back and revisit all of these issues brought up in one through six, one being a rather general one. So is that a consensus that we have, on those issues?

DR. MAURO: Yes, one through six covered.

DR. ROESSLER: Then what is your, Steve, would you want to just continue on and go --

DR. OSTROW: Yeah, let’s just keep going. Some of the other issues that are redundant we can just pull out anyway because they’re already covered.

ISSUE SEVEN

DR. ROESSLER: Do you want to go through sequentially and get into the radon exposure then?

DR. OSTROW: Let’s look at number seven which is radon exposure. I wasn’t quite sure how the radon exposure was actually handled. Perhaps maybe if one of the ORAU people explained how they did the radon exactly we can comment on it further.

MS. BLOOM (by Telephone): I’ve gone back
and glanced at the data, and there were some
measurements in different areas of the process
that were used to come up with a distribution
of radon measurements. I want to go back and
look at those more closely. I oversaw the
calculational approaches but didn’t look at
specifics in all instances. But I believe
that the data are very favorable to claimants
especially again considering that there is no
ore being handled during this later period.

But I do want to go back and check
when the measurements actually took place. I
did also go back and look at the Mallinckrodt
data where we have some measurements during
the later 1950s period when Mallinckrodt
stopped processing ore. And I looked at the
similarity of those exposures, and I think
that this is a reasonable number. But again,
I’d like to go back and check and not try to
argue it any harder one way or the other at
this time.

**DR. OSTROW:** This also brings up, I guess,
the question of the burlap bags again. I know
the African ore was just processed in the
early days during the SEC period. But the
question is what happened to the bags. Were they taken off somewhere? Were they still hanging around in the ‘50s? And if they still had the African ore residues in it, they could still be producing radon even into the ‘50s period even though the plant wasn’t processing African ore anymore. So we’re left with the question, detective question, what happened to the bags?

**MS. BEACH:** We talked about looking into the records of when they burnt bags and possibly that would give us some information.

**DR. OSTROW:** Yeah, yeah, that’s part of the detective story about what happened to the bags.

**MR. CRAWFORD:** These bags were stored outside?

**DR. OSTROW:** Yeah.

**MR. CRAWFORD:** Did you say that?

**DR. OSTROW:** They had tens of thousands that were just piled up.

**MR. CRAWFORD:** Then exposed to the Buffalo winter over a period of many years, and the summer actually, there should be a lot of bleaching and settling over such a time. But
what happens to burlap sitting outdoors for five or six years in that climate? I’m not sure either even if they’re not burned.

**DR. NETON:** Well, it sounds like we committed earlier to investigate this burlap bag issue.

**DR. OSTROW:** Right, this sort of relates to --

**DR. NETON:** And Cindy also suggested she was going to go back and look at the radon data and see what timeframe it covered. It’s not clear to me that these radon samples were all taken before ’47. I mean, I don’t know. We need to look at that and see if there’s a radon component. But certainly it is true that the radon levels would be lower, and should be lower, than what was measured during the African ore processing. One would think so.

**MS. BLOOM (by Telephone):** And a lot of those measurements that were made during processing were in closed areas of tanks where you got the hundred, there were hundreds of picocuries per liter values I should think. They’re not representative of what people
would have been exposed to on a long-term basis.

**DR. MAKHIJANI (by Telephone):** This is Arjun. How about the tailing areas for the radon like on still winter days or something like that?

**MS. BLOOM (by Telephone):** I want to go look at that again, too, Arjun, because my understanding is that the tailings went offsite to that Ashland facility from the domestic ores and the tailings from the African ores went to Lake Ontario Ordinance where I’m not sure exactly or I’m not sure that any material with high specific activities remained onsite. We do have some later data that shows that there is some radium in the soil, but I don’t believe that the concentrations are very high.

**DR. MAKHIJANI (by Telephone):** Yeah, if you remember, material from Mallinckrodt -- correct me if I’m wrong, Jim -- but material from Mallinckrodt was also sent to Lake Ontario. It might have been a little later, so it might have been onsite for some time, but I haven’t studied the Linde site very
much. I just went through it quickly to make
some comments for Steve.

**MS. BLOOM (by Telephone):** The K-65 from
Mallinckrodt did go to Lake Ontario.

**DR. ROESSLER:** The burlap bags with, we have
external coming up later, but on the internal
you’re only concerned about the radon.
There’s nothing else there?

**DR. OSTROW:** No, it also puts dust in the
air so it could be for the breathing it in
also.

**DR. ROESSLER:** So there’s more to follow
through than just the radon on the burlap
bags? Was that a part of --

**DR. NETON:** Yeah, I think Cindy’s going to
check into, if the bags were there, and they
had at one time contained the African ore,
then we have an issue with the entire K-chain
from uranium on down.

**DR. OSTROW:** So it may or may not be a
problem. It’s just something that needs to be
investigated. I think we’re finished with
issue seven then.

**ISSUE EIGHT**

Moving on, issue eight is the
raffinate trace radionuclides. And this basically, we brought up the question of raffinate traces were not adequately addressed in the Linde site profile. And the response we got back from ORAU was we concur there might be issues of assigned non-uranium intakes that have not been adequately addressed. This will be reviewed further. So that’s fine. It’s going to be looked into.

**DR. ROESSLER:** So that’s a promise, and we can go on to the next one.

**DR. OSTROW:** Right, the issue is taken care of.

### ISSUE NINE

Nine is this work hour thing again which is, we have actually two different places that we -- this is just, we have the comment which may or may not be important. It’s not a big thing. But there were different work hours assumed all over the site profile, 40 hour weeks, 48 hour weeks, 54 hour weeks, sometimes there’s a one-hour lunch break included or not included. They seem to have worked six-hour weeks (sic) in general at the plant and could have been eight-hour days
or nine-hour days six days a week, six days a week.

**MS. BLOOM (by Telephone):** The work hours changed as time went on and whether after the war the number of days decreased for some people. Depending on what job type you had the hours were different. And I was just looking at another contract that said thou shalt not work longer than 42-and-a-half hours per week. So the hours are all over the place.

For the internal dose and looking at bioassay this won’t be an issue anymore. For the external dose based on some badge data this isn’t an issue either because those are integrated exposures.

**DR. OSTROW:** That’s true.

**DR. BEHLING:** It would be an issue if you go to the 33 MAC time-weighted because it be --

**MS. BLOOM (by Telephone):** I agree.

**DR. BEHLING:** -- different if you use five days at nine hours a day versus six days versus eight hours a day because the 33 MAC is defined by the day as opposed to the hours.

**DR. ROESSLER:** Is that something that comes
up then after the evaluation --

DR. NETON: After evaluation of the potential coworker model. If it’s determined we can’t do a coworker model, then that becomes an issue. But if a coworker model is acceptable --

MS. BEACH: I just wrote down as an issue because they were sitting on potentially contaminated bags during their breaks and lunch. It was one of the observations I made by NIOSH’s answer that this period included lunches and breaks. But depending on where we go with those contaminated bags, were they routinely, it says on number 17 for years, were sitting on that. So that was just one of mine.

DR. NETON: Are you saying that they might not be wearing their TLD badges then or film badges?

MS. BEACH: Oh, they could. I’m sure that they would be wearing it, but they wouldn’t have had that break period that would have taken them out of a contaminated area if they were sitting within that contaminated on those bags.
MS. BLOOM (by Telephone): But the bioassay and the badge both integrate the exposure.

MS. BEACH: Yeah, that should take care of that.

DR. MAKHIJANI (by Telephone): Jim and Cindy, but the external dose reading would raise some kind of geometry issues similar to what we had --

DR. NETON: Right, right.

DR. MAKHIJANI (by Telephone): -- before at Mallinckrodt because you have, you know, the lower torso parts of the body.

DR. NETON: Yeah, that’s one of our overarching science issues that we’re attempting to address which is non-uniform, parallel-beam geometries. Agreed.

DR. ROESSLER: So that’s taken up in issue 14, another issue along the line of --

DR. NETON: I think the issue of non-uniform exposure geometry is being taken up as a site-wide, complex-wide issue at this point and will be addressed out of the context of this profile review. I mean, it will be incorporated eventually once we came to a determination of how to deal with it.
DR. WADE: But you captured his comment.

DR. LOCKEY: John, is that adjusted with an eight hour time-weighted average in the New York review?

DR. MAURO: It was represented as a time-weighted item. I don’t know if it’s eight.

DR. LOCKEY: Do you know the sampling time? Do they give you a sampling time? Do they have sampling times on there?

DR. MAURO: The data is not that detailed.

DR. NETON: They would sample the workers whenever they worked. I mean, they would follow the worker around all day.

DR. OSTROW: Yeah, there were sample type things.

DR. LOCKEY: Thirty minutes here?

DR. NETON: They would represent their entire work processes during the day in little blocks of time.

DR. MAURO: In theory if the guy they followed that worked ten hours, then whatever he did.

DR. LOCKEY: They’d follow them for ten hours if they were there for ten hours to capture whatever he worked.
DR. OSTROW: Yeah, the report doesn’t give any sort of detail on that though. I mean, you’re right. There’s no data on that.

DR. NETON: Based on past observations of these types of studies that have been done, they would follow the worker around the whole day. At least capture a representative block and then figure out he worked 15 minutes here, four hours here, three hours there. That sort of thing.

DR. OSTROW: That’s also the point. This is all done on one day, right?

DR. NETON: One week.

DR. OSTROW: One week, so in one week they did all this. I don’t know how representative one week is in the history.

MS. BLOOM (by Telephone): I think this was factory type work, and it probably was fairly representative which isn’t to say that things didn’t change over time, but I think they went in to try to find very representative conditions.

DR. LOCKEY: It wasn’t enforcement, right? Is that correct?

DR. MAURO: No, this was, at that time all
this was done because the AEC just took over, and they implemented a program. Listen, we got all this activity going on, supporting either the war or the post-war effort really to manufacture uranium. And they have all these private companies that we enlisted into this operation. We better find out what the heck’s going on. And that’s when they sent out the folks that have, a lot of my former professors, and went out to see what’s going on.

So it was a data gathering effort, and they found out there was a lot of bad practices going on. So I’m convinced that the seven facilities that they investigated, they did not clean up. They took a look at them, what was their practices, and then they put out all these reports subsequent to that that came out in the ’50s. They said things are pretty bad out there. We’ve got to fix this on all levels across the board, everything from incineration to grinding and machining to lathing operations to the need for ventilation systems. That all came out later.

So I think I feel pretty confident
that the NYOO 1949 report captures the down-and-dirty underbelly of what the heck was going on in those days before they really took some serious steps to clean up. That’s how I see it.

**DR. OSTROW:** I agree, John. I just read this yesterday quickly, but they mentioned that Linde needs to be cleaned up; however, they don’t think it’s going to happen because they’re going to stop processing soon anyway. So they’re not going to do it basically.

**DR. LOCKEY:** That was after the sampling was done.

**DR. OSTROW:** Yeah, yeah, it was like a comment made in the report on that. Because they were supposed to shut down operations anyway soon.

**MS. BEACH:** And that was done in the year 1949?

**DR. MAURO:** The report came out in ’49. Yeah, and they give you the dates when the actual sampling was done. It was done -- here it is, from October 26th to November 2nd, 1948. That’s when they actually went out there. So it was a one-week period, but you’re right.
You’d normally expect that if their real intention was to get a snapshot of what’s going on out there; let’s see if we can make things better, they would have tried to do a good job. And these were the best there were. I mean, I, these are the people, guys like Merril Eisenberg, (unintelligible) Cassidy. These were the people who were the forefathers of the whole industry were there. So, I mean, I’m --

**DR. LOCKEY:** Can you send a copy? Is that available?

**DR. MAURO:** I have it right here. The copy is electronically, yeah, I got it off the web. You guys put it up. It’s on your web. I’m trying to think of where I found it, the NYOO report, this report. The New York Operations Report. I call it the 1949 report.

**MR. ELLIOTT:** As we, as these documents are introduced, we need to make sure there’s a folder on the O drive.

**DR. NETON:** I think it’s out there, but I --

**DR. MAURO:** It’s out there.

**MR. ELLIOTT:** Well, we’ll send an e-mail out and let everybody know where this is at.
MS. BEACH: Yeah, that’d be great.

DR. ROESSLER: So what you’re saying, John, is you’re confirming the importance and validity of this database. There’s no bias or anything like that.

DR. MAURO: I think that this was a genuine effort made by the New York Operation Office under the auspices of the Atomic Energy, the newly formed Atomic Energy Commission to get out there and clean up their act. They felt that there were all these private companies out there doing all this important work that did not have (unintelligible). And they actually said if you read the text. It’s right in the introduction. So this was a nightmare. These places were filthy. There were given no good controls. The exposures were, I mean, it’s right in the beginning. It says that. And here’s all the data that characterizes it.

DR. ROESSLER: Answer my question. You feel that the database is valid?

DR. MAURO: Yes.

DR. ROESSLER: And that it is not biased?

DR. MAURO: I feel the database is valid to
the extent that one week’s sampling of worker 
activities captures the full range of 
activities. But I think that was an attempt 
to be as valid as you can make it.

DR. LOCKEY: One interesting thing they 
answer other questions is the way they looked 
at the work records during that timeframe and 
to see if this was representative of the hours 
worked during the weeks during the month 
during that timeframe.

DR. NETON: That’d be tough to do. I don’t 
know if we have that.

DR. BEHLING: I have a question, John, what 
were the dates (unintelligible).

DR. MAURO: Late ’48.

DR. BEHLING: No, no, not the year but the 
timing --

DR. MAURO: End of October, the beginning of 
November 1948.

DR. BEHLING: Okay, because one of the 
things that we do learn is that during those 
years air conditioning was not existent and 
ventilation was questionable. Warmer times of 
the year there was obviously the windows were 
open. The doors were open, and so it does
have a seasonal aspect to it.

DR. MAURO: Absolutely, and that’s why this

DR. NETON: I think this has a great point
that we have the 700 bioassay samples we can –
- the coworker model and see how that fares
against the 33 MAC value that they calculated.

DR. MAURO: This is going to validate. See

DR. NETON: My guess is we’re going to come
out lower but I don’t know.

DR. OSTROW: And I agree also that the
bioassay is much better. You have decent
data. It’s a good answer to a lot of these
questions.

DR. NETON: But it’s a good, a great
opportunity though to sort of validate what
they’ve done.

DR. MAKHJANI (by Telephone): Jim, this is
Arjun. In the validation exercise I guess if
you’re trying to match them up, you’d have to
have some knowledge of the solubilities and --

DR. NETON: Yeah, I guess validates probably
not the right word, Arjun. I think just to
compare the two values, we would, of course,
use both solubilities. I don’t know if we would. We could use both solubilities, but you don’t know, for example, if the workers did, if the workers did wear respirators, then that 33 MAC value is not a good comparison to begin with.

So all that we can do is to compare it and show that it looks like the urinalysis data possibly, if it’s a good, valid coworker model, comes out and has an exposure that’s either equal to or smaller than the value that was, you know, that you would infer from the 33 MAC.

DR. MAKHIJANI (by Telephone): I agree with you.

DR. NETON: You know, you’ve got particle size issues. If these are five, ten, 15 micron particles, it’s clearly been shown in past studies that the urine -- the respirable fraction is much smaller than what’s in the particle sizes that are, the air samples that are used so there’s a lot of caveats here. We have a problem I think if it comes out that the coworker urine model shows a higher level of MAC exposure than what was measured in this
study that would be not a good outcome, but we, of course, would have to deal with it at that point.

DR. ROESSLER: So it appears on issue nine that because it’s not an issue right now in the internal or external that the work hours would be taken into consideration by both the bioassay and the film badges. Is that the way you read this then?

DR. OSTROW: Yes.

ISSUE TEN

DR. ROESSLER: So now we’ve kind of lopped into issue ten, I think, if we’re done with issue nine.

DR. OSTROW: Ten is easy because I think we’ve reviewed it. I discussed it with John, and I think we should withdraw issue number ten. We decided that’s not an appropriate issue.

DR. ROESSLER: So you want to withdraw it completely?

DR. OSTROW: Yes. We discussed that.

DR. ROESSLER: Does everybody, anybody have any comments?

DR. NETON: No comments.
DR. ROESSLER: Give me a concise statement as to why you withdrew it.

DR. MAURO: If the 33 MAC is, in fact, a plausible upper bound, there’s no reason to be concerned with the uncertainty in that number.

ISSUE ELEVEN

DR. ROESSLER: Okay. So then how about issue 11?

DR. MAURO: Eleven’s a good one.

MS. BEACH: Can we go really quick back to ten? So the ventilation and all that stuff is not an issue? Because that was one of the ones that was in ten, poor ventilation, non-existent -- does that cover all that then?

DR. MAURO: This goes back to the 33 MAC.

MS. BEACH: Okay, so it will be covered there?

DR. MAURO: Yeah, if the 33 MAC, if we didn’t have the bioassay data and that’s going to let us know, right now the position that NIOSH has taken, and that we tended to agree with, is that the NYOO report was a good -- in other words if you have all this data. You have 21 different categories of workers at Linde alone. That’s just Linde. They did it
for seven different facilities. At Linde alone they picked the worst category which had 33 MAC. It seems to me that that ain’t bad except for the problems that Hans brings up. If they happened to pick a week that was in the winter or the summer, and this sounds like it was in the winter, it may have been closed conditions up at Linde --

**MS. BEACH:** Worst conditions.

**DR. BEHLING:** No, no, if you look at Fernald, the worst of the hot summer days when they left doors wide open --

**DR. MAURO:** And the wind blew through.

**DR. BEHLING:** -- fugitive emissions were blown throughout the whole facility. The summer is probably the worst time.

**MS. BLOOM (by Telephone):** I think it would change depending on the facility from day to day and whether you had inversions and all sorts of things. And it would be a tough call. But I think again you’re talking about a fluorination process here where there were ventilation, mechanical ventilation added to the systems to reduce worker exposures, to reduce wear and tear on equipment. There were
issues about the acid concentrations in the air. So I don’t think it’s reasonable to assume that ventilation was nonexistent or worse than at other facilities.

**DR. ROESSLER:** What about number 11?

**DR. OSTROW:** Eleven issue requires some discussion. This comes up actually the same similar issue in 11, 15 and 20. It’s tough so I will read them, about the use of geometric mean values where it’s appropriate and where it’s not appropriate. And based on our reading of this it looks like the response to issues 11 and 20 contradict each other at least partially.

It looks like issue 20 took into account or mentioned that the response, mentioned the OTIB-20, which was released after the site profile was done in October ’05, where there’s three different categories of exposure. And that wasn’t factored into the response to issue number 11 here.

**MS. BLOOM (by Telephone):** OTIB-20 only applies to external dose. It does not apply to the radon information. Again, a lot of these were process samples and samples taken
at surfaces not where people’s breathing zones were. And I said I plan to go back and look at these again.

**DR. MAURO:** I think this is almost a generic issue. Our understanding is that in responding to number 11 where we raise this question about the geometric mean, the answer basically came back, well, it is standard policy to use the full distribution or the geometric mean as a reasonable representation of what a given worker may have been exposed to.

Now it is our understanding -- and, Jim, please correct me if I’m wrong -- that that approach was something that was adopted very early on because I remember that was an issue that we confronted when we dealt with Bethlehem Steel. Subsequent to that a somewhat more claimant favorable philosophy has been embraced whereby there are certain conditions, yes, when you’d use the full distribution of a given dataset as a surrogate for a person who wasn’t monitored.

So if you have a person who wasn’t monitored, and you want to reconstruct his
dose, whether it’s external or internal -- I guess I’ll take it to that extent -- whether it’s external or internal, you have to ask yourself some tough questions. Do I apply to this person the full distribution or do I apply to this person the upper 95th percentile value? And the answer that was provided in number 11 seems to have come back with the old school. Well, we could apply the full distribution or the geometric mean. I don’t think that’s the case any longer.

**DR. NETON:** First of all this document was written before any of those concepts had been fleshed out. I know the answer is current, but Cindy’s right. The TIB-20 only applies to external dose issues, and in particular, penetrating dose, photons, photon dose.

We still do not have a generic position for internal because we feel that it’s more, it’s not as clear cut as in the external arena. For example, in the Department of Energy facilities, if you adopt a carte blanche position that all workers should receive the 95th percentile who weren’t monitored for internal dose, you’re in the
position of assigning more dose to the 
unmonitored workers than 95 percent of the 
monitored workers. It just doesn’t sit well 
with us.

I think we have not put a policy in 
place because we’d like to evaluate this on a 
case-by-case basis. There are situations, and 
this may be one of them, where the 95th 
percentile of internal makes some sense. We 
just have to look at the data and see what it 
says.

Somehow if we can document that the 
highest exposed workers were monitored -- 
we’ve not been very successful in convincing 
you folks that that’s true, but say that we 
could come to that agreement -- then we 
certainly wouldn’t apply the 95th percentile to 
those. So I think we’re in agreement. It’s 
just that the official policy for external is 
in place, but we did not put that --

DR. MAURO: Well, that wasn’t articulated 
in, the only reason I’m bringing it up, in the 
response to our question number 11, what you 
just described wasn’t articulated, but it was 
later on dealing with external. And I
understand.

DR. NETON: We’re not against the 95th percentile, we just want to use it judiciously in internal exposures.

DR. ROESSLER: So what have we done with 11 and 20? I don’t think we’ve even looked at 15.

DR. OSTROW: Are you going to try to develop some position for this or are we just going to continue looking on a case-by-case --

DR. NETON: Right now it’s a case-by-case basis. It’ll be a position for this particular site that we’ll adopt.

MS. BLOOM (by Telephone): I think I can think of an example where you’re talking about perhaps data, and this is not for this particular site but the St. Louis airport site where they have radon measurements on top of the piles out there. And you might choose to make those a distribution or you might choose a 95th percentile. But for that particular site because people aren’t out there, the distribution would be much more reasonable. And to prescribe using the 95th percentile wouldn’t be reasonable because people aren’t
out there all the time.

**DR. NETON:** Right, that’s a good example. Another one that comes to mind is Chapman Valve. We had so few bioassay data points that we took the highest value we could find.

**MS. BLOOM (by Telephone):** And we went the opposite way on that one.

**DR. NETON:** So it depends on the individual situation what we feel using our professional judgment gives the claimants the fairer shake. Although if we could put it all in one place it would be better. I would agree that, you know, if we could consolidate all into one --

**DR. MAURO:** On a case-by-case basis what happens then is, of course, then you have to make your case why in this particular case we did this. So I think it’s going to be, you know, and you have to review a lot of data and make your arguments on a case-by-case basis.

**MR. ELLIOTT:** And maybe we’ve got to make sure we do it consistently where it’s appropriate.

**DR. NETON:** I’m not saying that we wouldn’t entertain making a policy in one document, but right now I don’t know that we’ve got enough
sense as to put it all in one place and make a
generic document.

DR. OSTROW: Okay, I think that takes care
of 11, and I think 20 also again.

DR. ROESSLER: And 15, I imagine we’ll wait
until we get there?

DR. OSTROW: Yeah, 15, maybe yes, maybe no.
I have to see what it is.

DR. NETON: Did we skip over 13?

ISSUE TWELVE

DR. ROESSLER: We haven’t done 12 yet.

DR. OSTROW: Okay, this one also is related
to the 33 MAC. This goes away if 33 MAC
really is an upper bound, and if you’re going
to be using the bioassay data which could be
even better then you don’t need a
comprehensive uncertainty analysis. This
relates also to the 33 MAC and the bioassay.

ISSUE THIRTEEN

DR. ROESSLER: And 13, right?

DR. OSTROW: My comment basically here is I
didn’t understand, well, literally it might be
my problem, how some of the external dose was
done. It’s a scheme that’s quite complex, and
I had read several paragraphs. I just
literally could not understand them. Maybe it would be clearer to the dose reconstructor or the people who wrote it, but I just literally couldn’t understand it.

DR. ROESSLER: You’re talking about just the missed occupational dose?

DR. OSTROW: Yes, for 13.

DR. ROESSLER: Missed external dose.

DR. OSTROW: Yes, excuse me.

DR. ROESSLER: What do we need to clarify on that?

DR. OSTROW: I think if the -- going to comment, I have one example, but I think it’s if the TBD is revised, just parts of it should be rewritten. That’s my comment on it, editorial things. I’m not saying it’s wrong. I swear I couldn’t understand it.

MR. ELLIOTT: It’s complex, and you didn’t have a clear understanding of what the approach was.

DR. NETON: So, Cindy, would it be too difficult for you to explain in simple terms here exactly the approach?

DR. OSTROW: Simple enough for me, please.

MS. BLOOM (by Telephone): I think that the
approach that was taken in this rework was to try to use every piece of information available to develop a very well reasoned and complete argument as to what the doses were. In the final hour reviews came back that indicated this has to be usable by dose reconstructors as well.

And so we went and in order to not lose information but to make a more simplified approach, we came up with the table in the last section of the external section. But I think this is always, you know, how simple do you make your assumption so it’s readable and people don’t have to go back through all the pieces and parts of data versus how accurate do you want to be in terms of presenting all that information. And it’s a challenge to say the least.

DR. OSTROW: I think the comment was also that the, it wasn’t clear at all times the distinction between the sort of background information. You present a lot of data, background data, and then you came up with the conclusions that the dose reconstructor could use. It wasn’t always clear reading it the
distinction between the two, whether the dose 
reconstructor is actually supposed to use a 
particular piece of data or this is just some 
point of information that’s not going to be 
used.

**MS. BLOOM (by Telephone):** What we actually 
tried to do was to make that last summary 
table the place where unmonitored workers’ 
doses would be found so dose reconstructors 
didn’t have to dig into the details of how 
that information was developed. But I don’t 
see this as a small task to rewrite this 
section, but it certainly can be done.

**MR. ELLIOTT:** Has there been guidance given 
to dose reconstructors that’s not in the 
technical basis document or has guidance been 
given for dose reconstructions for Linde in a 
workbook fashion or is there something else we 
could rub off against the language in the 
technical basis document, against, that would 
help people understand how the approach works?

**MS. BLOOM (by Telephone):** I have not seen 
or heard of any guidance although some of this 
might be included in a workbook. But I think 
I did look at one dose reconstruction that
SC&A had reviewed, and I found that the dose reconstructor had actually made it look very easy when they said we’re going to find the maximum dose in this table. We’re going to apply it, and now we’re done, and so that particular case looked very simple. But I’m not aware of any other information.

Is anybody there that might be able to answer that?

MR. CRAWFORD: One interesting factoid is that of the 230 cases that NOCTS shows having been filed, 130 have already completed dose reconstruction. So apparently it hasn’t been an inexplicable TBD. It has been used. We have a 51-1/2 percent compensability rate for those who had the --

DR. NETON: Table 36 is what they’re using here, and I guess the question is does SC&A have an issue with those being bounding doses. They’re pretty large doses if you look through the table of external gamma dose for workers, three rem, 1.6 rem, 1.7 rem, and those are fairly high doses for a uranium facility.

DR. OSTROW: Gen, I don’t know of any, at least I didn’t have any issues with Table 36,
the final results. As you mentioned they are pretty high. We just had some trouble --

DR. NETON: Understanding.

DR. OSTROW: -- but we were trying to figure out where all the numbers came from in some cases.

MR. CHAN (by Telephone): I think, Steve, I have a recommendation. This is Desmond Chan again. If you go to our report in Table 5 dash three on page 58. We tried to actually track Table 36 back to all the other tables, and I think there’s a few places we cannot trace back to the sources. And also I think part of the big concern that when we review all this tables, I think the basis of most numbers came from one of the survey readings early in the ’50s after the flushing and the cleaning of the Building 30. And then that number was used as the basis for all the other numbers.

MS. BLOOM (by Telephone): No, no, no, that was --

MR. CHAN (by Telephone): I think that probably is what the question will be, you know, for you, Cindy. Maybe we misread it.
MS. BLOOM (by Telephone): No, I think there are a lot of different time periods addressed in there.

MR. CHAN (by Telephone): Right, right.

MS. BLOOM (by Telephone): There’s the time period before work started up at the ceramics plant which is different from the Tonawanda laboratory.

MR. CHAN (by Telephone): Yes, there’s two separate, you know, tracks there, yeah.

MS. BLOOM (by Telephone): And there’s a period where they were handling African ore at both facilities. There’s a period where there was a clean up and a standby period. Then they started up operations with U-02 again. And then there was another clean up period. So it’s not a simple site to address.

The early data is based on, as you mentioned, some information related to a clean up survey that was thought to be a reasonable basis for capturing both the ceramics plant contamination which there was no uranium being used at the ceramics plant itself yet in the early days, and was also used for the later period of operations. Source term information
was primarily used for the early African ore days, and then later we have some film badge data that was available to estimate doses for the U-02 operational period.

**MR. CHAN (by Telephone):** I do agree with you. I think when you go back and look at all the tables, and I think we actually tried to map Table 36, the data came from at least seven or eight other tables, Table 15, Table 21, 35, 18, 33, and they all fit into that summary table I assume the dose reconstructor can use. And in a few places like, you know, I mentioned in Table 5.3 and then 47 for the ceramic plant, we cannot track back to any other tables. And the same with 1949 for the neutron dose, we cannot track back to the sources. So I assume that maybe we --

**MS. BLOOM (by Telephone):** 'Forty-nine was not calculated. The 1949 was based on source term data, and there’s actually a neutron section in there that explains how those were calculated using OTIB-24.

**DR. ROESSLER:** We’ve been asked to take a break soon. Can we bring this particular issue to a close? Is there a recommendation
as to what needs to be done to clarify this? Is it editorial or is it okay?

DR. LOCKEY: Let me ask a question. Do you feel that the boundaries put on one amount of workers is claimant favorable?

DR. OSTROW: Well, looking at the final numbers you have in your Table 36, they look good. They’re high numbers. They’re probably claimant favorable. We just had trouble sort of doing a QA on it, trying to figure out where some of the numbers came from. You know, if they came from some of the other tables, then reading the text, but I’m having trouble trying to interpret the text also in a couple of cases. We’re not claiming that they’re wrong. It’s just that they’re hard to interpret.

MS. BLOOM (by Telephone): I guess from where I sit I’d like a minute to maybe -- not today but over the next week -- go back and talk to OCAS about what this would take to, I think the documentation, we could make an attempt to write it more clearly. I know I’ve reviewed and used this a lot of times and tracked the numbers through, so I think it can
be done.

And if all we need to do is write it more clearly, that’s one thing. If we need to go back and maybe simplify the approach in general because it’s so complicated that even if we write it more clearly, reviewers are going to be frustrated, then I think the answer is different. I’d like to be able to talk to NIOSH before we decide on a path forward on this.

**MR. CHAN (by Telephone):** Cindy, maybe I have a recommendation. I think from a reviewer’s standpoint maybe you just even work on Table 36 and have a lot of footnotes and where the numbers come from. That may be enough.

**MS. BLOOM (by Telephone):** Yeah, I think we have 13 footnotes associated with that table.

**MR. CHAN (by Telephone):** Yeah, but there are still kind of gaps in there that we cannot be able to track, but that may be able to fill the gaps. That’s all my recommendation is.

**MS. BLOOM (by Telephone):** Okay, I’m looking at the wrong table anyway.

**MR. ELLIOTT:** What about some example dose
reconstructions which would apply the use of
the table and walk people back through it.

**DR. MAURO:** No, that’s not the problem.
See, I think that, in fact, this is a
recurring theme that we’re running into. I
think that the final tool that says here’s a
look up table. Use it, but to the dose
reconstructors. And they do. That’s great.
And it may very well be a great tool and be
claimant favorable.

But you have to realize, we, on behalf
of the Board, have been asked do you believe
that the table that’s been prepared is
technically sound and well based and good
science and good data. So we do our best to
go back and figure out the rationale, how they
got there. And very often we find ourselves
challenged to be able to figure it out.

I know Hans ran into the situation in
the story we told earlier where we talked
about this whole neutron to photon ratio and
what was really done. The story Hans told
represented taking all this information and
trying to sort it all out, and they could make
sense. So what you read really was an heroic
effort, quite frankly, to try to take a
massive amount of information and tell a
story.

Now, in Hans’ case I think he managed
to break the back of the problem. He figured
it out, said, ah, I think I know what they did
now. In this case we weren’t able to break
the back of the problem. We could not figure
out how he got there.

MR. CHAN (by Telephone):  John, we did get
90 percent of the information together and
then how they put into Table 36. But we just
still have some missing link somewhere that’s
all.

DR. NETON:  Maybe that’s the solution to
pose those questions to us that you’re still
missing. Have us generically go and answer
all --

DR. MAURO:  Fair enough.

DR. WADE:  Maybe have a telephone call.

DR. NETON:  Yeah, we could do a telephone
call or whatever.

MR. CHAN (by Telephone):  We can do a
sidebar on this way.

DR. NETON:  Because rather than have us
answer everything.

**DR. ROESSLER:** We reached a conclusion on this one.

**DR. MAURO:** That’s good.

**DR. ROESSLER:** So we’re going to take how long a break?

**DR. WADE:** We say ten minutes, and God knows how long that could be.

**DR. ROESSLER:** So my watch says 25 to three, so about quarter to or a little after.

**DR. WADE:** We’re going to take a ten-minute break. We’re going to mute and come back on in ten minutes.

(Whereupon a break was taken from 2:35 p.m. until 2:45 p.m.)

**DR. ROESSLER:** Work group on Linde ready to resume. I think we have resolved through issue 13.

**DR. MAURO:** That’s correct.

**ISSUE FOURTEEN**

**DR. ROESSLER:** And so let’s go with 14 then, Steve.

**DR. OSTROW:** Fourteen, we titled it “Film Badge Data,” and this one goes on here. This is a question on, this is actually related.
This is a question on the Table 36 also basically, and how Table 36 with all the different components went into this. So if I’m reading this correctly, my own comments here, I think this is actually covered by what we were just discussing about sort of the need to explain how this Table 36 came about. What the different components are in it.

DR. ROESSLER: Okay, so that one’s --

DR. OSTROW: Fourteen, yeah, so 14 is covered by the discussion we just had on Table 36.

DR. MAURO: And I also think it goes a step, there’s a second aspect to it. And that has to do again, it appears that the Table 36 recommended value was a median for a population of numbers that are being recommended.

When using the median or the full distribution, and this is external, I believe, the question is should we be working with the median as your surrogate for unmonitored workers or should you be working off the 95th percentile? So I think that this sort of goes toward the conversation we had before.
So in addition to, I guess, the ball is in our court to pose a focused question regarding how did you do 36? This is what we don’t understand. And we’ll do that. On top of that we would like to put on the table that how does the new, I guess, philosophy regarding the use of 95th percentiles play on Table 36?

MS. BLOOM (by Telephone): I think that’s addressed by Comment 20 that says we don’t feel that we incorporated our new direction, and so we need to do that.

DR. MAURO: Okay, good, then we’re in agreement.

MS. BLOOM (by Telephone): Yes.

MR. CRAWFORD: To a certain extent it seems to me that by locating the high, medium and low exposed workers in the way you did, you’re informally breaking them up into groups. The higher workers might need the 95th percentile for unmonitored workers. So we just need to make that more defined.

DR. NETON: Yeah.

DR. MAURO: Right.

MS. BEACH: I had a question regarding this.
Do we have a sense of what was happening during that stand down period? It was a long period of time. And was there any monitoring done during that period? Because I know for me stand down in my plant means you’re doing housework. You’re cleaning. You’re sweeping. And I’m curious about that period of time, and if there’s any --

MS. BLOOM (by Telephone): I would have to go back and look at the external data for that period. I don’t have the answer to that right now.

MS. BEACH: Thank you.

DR. NETON: I’m sorry, I missed that Cindy. Did you commit to looking at the stand down period? Is that what we missed?

MS. BLOOM (by Telephone): No, I just said I don’t know the answer.

DR. NETON: Okay.

MS. BEACH: Well, it’s just a long period of time, and I was wondering if there was monitoring done during that time as well.

DR. ROESSLER: Are you okay on that, Josie?

MS. BLOOM (by Telephone): I think there was about a year, right?
MS. BEACH: Yeah, it was a little over a year, 8/1/46 to 9/14, but they really didn’t start production until 11/47. So I’m wondering what the workers did during that time period and was there monitoring for whatever they did or didn’t do. Just a question.

MR. CHAN (by Telephone): Cindy, I have a question for the site profile Table 13. Do you have it?

MS. BLOOM (by Telephone): Site profile Table 13.

MR. CHAN (by Telephone): Yeah, that leads into Table 36. I think that’s the basis for the beta dose, the beta-gamma dose which I think I mentioned earlier. In 1949 there’s a survey done, and that survey number after vacuum cleaning and flushing. That number’s been used as the basis for a few years of external dose calculation.

I think it’s a factor of three for some reason used to, as a multiplier for the survey data and to project back for before vacuum cleaning, before flushing. So you use the number to go back to 1948 and ’47. So I
just do not know where that factor of three comes from. Is it just a number you guys decided to use based on some dose number calculation?

**MS. BLOOM (by Telephone):** I would have to look at that specifically again. I believe there was, I have a vague recollection of data from both time periods that Jerry Davidson (ph) had looked at, and there was about a factor of three difference, but I may be thinking of the wrong --

**MR. CHAN (by Telephone):** Right, footnote C on the table said assumed to be three times higher --

**MS. BLOOM (by Telephone):** Okay.

**MR. CHAN (by Telephone):** Than the pre-decontamination values. So I think it’s an assumption. So I just want to know the basis for the assumption because it affects all the other values because that is the basis for everything else.

**MS. BLOOM (by Telephone):** Again, I think that particular data only applies to a very short period, but I’ll have to look at that again.
MR. CHAN (by Telephone): Okay.

MS. BLOOM (by Telephone): So it’s the basis of the factor of three for Table 13?

MR. CHAN (by Telephone): Right.

DR. NETON: It says right after that the factor of three is based on the April 1949 data. See discussion in text.

MR. CHAN (by Telephone): Yeah, but I don’t see the discussion. I don’t see the justification or explanation why, what is factor three from, and how they calculated the factor of three. There’s no explanation of that.

DR. ROESSLER: So John will include that in his focus question regarding Table 13.

MR. CHAN (by Telephone): Yeah. I think that table eventually will fit into a few places in Table 36, the values.

MS. BLOOM (by Telephone): I think that’s as you look at the before vacuum cleaning and flushing and pre-decontamination. I’m going to say that’s where it is, but that’s not quite right either. I’ll need to look at that again.

MR. CHAN (by Telephone): Okay, thanks.
DR. OSTROW: Desmond, I think the conclusion is we’ll have to come up with a nice, concise list of where, specifically of questions that we have, and then I’ll send them out.

ISSUE FIFTEEN

DR. ROESSLER: We can go to 15?

DR. OSTROW: Yeah. Fifteen deals with the survey measurement data that’s included in the TBD. And this relates I think to number 20 that we talked about before, about the idea of using the geometric mean values. And the response said we believe that the application of GSD of three to estimated unmonitored worker exposures adequately accounts for bias and uncertainty.

So the question, this is related to the question before where they were looking at the highest 95th percentile values or the time average values. I mean, that’s the way I read it.

DR. MAURO: Yeah, I think this is the recurring theme again. That is, when you work with a geometric mean and the geometric standard deviation as being a surrogate, in this case it’s external, we hearken back to
the 95th percentile question. Certainly there, again, there are times when using the full distribution makes sense, but there are times when it may not.

But in this particular response it seems like a generic position has been taken that’s contrary to the position that’s described later. So this is the same thing we had before. Namely, the full distribution is not necessarily the answer.

So if you have survey data, you have a distribution of information, I don’t think you’re done and just could automatically say we’re going to use that full distribution to represent everybody, one size fits all. I think that has to be used very cautiously the way Jim described it earlier. I guess that’s all. So it’s the same thing. I would say 15 is the same as the other two we talked about earlier.

MR. CRAWFORD: Except that Cindy’s explanation here suggests that there’s a systematic bias in the survey data typically. Break in if you want, Cindy.

That would lead us to over predict the dose
from these surveys because, as she says, they tended to put the monitoring equipment where they expected the most dose.

DR. MAURO: And if that case can be made for all categories of workers, that’s fine.

MS. BLOOM (by Telephone): Right, and this is not a coworker data study. This is using the measured doses from the workplace.

DR. NETON: Right.

MS. BLOOM (by Telephone): But we can look at this again and as you know, make our case and --

DR. NETON: Exactly, I think we just need to be consistent with the new TIB-20 and we can do what’s right. We just need to document it better I think.

DR. MAURO: Okay, fine, good.

ISSUE SIXTEEN

DR. OSTROW: Issue 16. This talks about the, also did he capture the doses’ time weighted average business. Again, did he capture the possible exposure to high dose or high risk tasks. And the answer back is that ORAU’s not aware of any such high dose or high risk task performed during the standby period.
If this is true, then it’s okay. I mean, we –

**MS. BLOOM (by Telephone):** We’re looking at 16 now?  

**DR. OSTROW:** Sixteen, yeah. Basically, Cindy, you looked at all different tasks and you weren’t aware of any particular high risk tasks or high dose tasks?  

**MS. BLOOM (by Telephone):** At this time I’m not aware of any. That doesn’t mean there couldn’t be any there, but I’m just not aware of any.  

**MR. ELLIOTT:** So, Cindy, this is Larry Elliott. Is that based on the documentation you’ve seen? In other words we haven’t seen any documentation that’s contrary to that.  

**MS. BLOOM (by Telephone):** Jerry Davidson looked at this data really hard for over a year trying to develop reasonable estimates of exposures, and I haven’t seen anything that he put together. I haven’t seen any of the references, any information myself that indicates that we missed something. But, again, as I go back and look at the information to develop some of this other
answers, I will look at this again.

DR. ROESSLER: Are interviews with workers pertinent here? Is there any information on that?

MS. BLOOM (by Telephone): We review all the CATI responses. I also review the worker outreach minutes when they become available. There are some indications that during the early years exposures were definitely very high, and I think we’ve captured those in the tables. I don’t recall seeing anything that we missed on a generic level, but we do look at all that kind of information in developing, the group that I work with, in developing the AWEs. We check.

MR. ELLIOTT: Have we posed any questions specifically to the standby era as to what tasks were performed?

MS. BLOOM (by Telephone): I’m not aware of any.

DR. NETON: This says 1946 to ’47. Is that not in the SEC period?

MS. BLOOM (by Telephone): Yes, it is.

DR. NETON: And so it seems the central question here might be related to the SEC
period which has already been granted.

**MR. CHAN (by Telephone):** But this is specific to the external though. The SEC is dealing with internal, right? I assume.

**DR. NETON:** Right, good point.

**MS. BLOOM (by Telephone):** (Unintelligible) brings most workers in at that point so you’d have skin cancers and prostate.

**DR. ROESSLER:** Okay, so Cindy’s going to take another look at it, and does that cover — —

**DR. OSTROW:** Yes, that’s fine.

### ISSUE SEVENTEEN

**DR. ROESSLER:** Okay, then let’s go to the fun one, issue 17, on the burlap bags.

**DR. OSTROW:** I think we discussed burlap bags ad nauseum. We discussed that. It’s important for inhalation, might be, to look at inhalations. It might be a direct dose also. Especially if you have people sitting on them it might be a skin cancer contributor or potential — —

**DR. NETON:** If we look at it from the perspective of the ore itself, the progeny in the ore in addition to the uranium.
DR. OSTROW: What bags were there when.

DR. NETON: It might be tougher to figure
out than we’d like, but we’ll certainly look
at it.

**ISSUE EIGHTEEN**

DR. ROESSLER: Issue 18.

DR. LOCKEY: I’m sorry, what was resolution
16? I didn’t catch that.

DR. ROESSLER: Cindy says she’s going to
look through all this information again to
make sure that the approach for the, there
were no, maybe Chris or somebody else should
say this, high dose or high risk tasks that
need to be taken into consideration.

DR. LOCKEY: Is that going to be including
the stand down period for external?

DR. ROESSLER: Yes.

DR. OSTROW: Okay, issue 18 is the surrogate
external exposure data.

MS. BLOOM (by Telephone): Where are we now?

DR. OSTROW: Eighteen, issue 18.

This was a question, when we went back
to talking about that famous Table 36, it’s a
similar type question. I said that the
process being used, a lot of different data
went into it, and it’s complex. And we weren’t quite sure exactly how it was being done in all cases. How the different things were, we mentioned that they’re, I think we mentioned five different types of data that were here: pre-clean up survey data, eight solid ore sample data, one-day survey in six locations, two one-day pre-cleanup survey data after vacuuming, flushing, post-decontamination survey data. We weren’t quite sure how all the pieces fit together here. So we don’t have a confident feeling that it was all done sort of transparently.

**DR. MAURO:** We’d like to be in a position where we can go to the original data sources as referenced or provided, and then go from there and stepwise reconstruct and match the recommended numbers that you have in your lookup tables. And need, we owe to you the places where we were not able to do that. But also at the same time, once we do that, once we’re at a point where, okay, now we understand exactly what was done.

The other thing we owe is whether or not we believe -- because right now we’re
really sort of groping, whether or not we believe that the construct for your system, for surrogate external data adequately captures these high end groups. Our recurring theme over and over again is that, and we see it all the time, is, yes, I think that you’ve got all the data. Now we understand what you did. We can match your numbers.

Then we have to ask ourselves the question, based on that information do we believe that all workers for different categories of workers and that have different functions, different places, are getting the benefit of the doubt. Or is it possible that the construct is only going to, is going to be fair to 50 percent of the workers. In other words if you work off the median or if you work off the full distribution, I guess, we owe you -- see, we’re in a funny position.

We don’t quite understand how you came up with your construct, and once we understand it, we’ll be in a much better position to make some constructive criticisms on whether or not we believe that that construct is in fact claimant favorable for the full array of
different categories of workers. Now one of
the problems we may run into is that we may
not have a full appreciation of the diversity
of work that took place.

So we may be left in a funny position
where we say, well, if we look at it all, and
we say, okay, I think we understand the full
range of the different kinds of activities
that took place. And it looks like the worst
category of activity from an external point of
view were people who did this. Given that is
there adequate data in the dataset that allows
you to construct a surrogate for that category
of people that we feel, yes, is given the
benefit of the doubt to that group of people.
And then we’re done if the answer is yes.

But I don’t think we’re, because we
got sort of stopped midstream where we really
couldn’t figure out how your construct came
about, we can’t answer the ultimate question
for ourselves. We’re sort of left in the --
‘til we do that, so we’re not home yet. That
is, after we pose it, we have this exchange on
Table 36 and these other tables where we say,
ah, okay, now I know what was done, how they
did it. I see the data that they used, and I can match their numbers.

Then we’re going to have to regroup amongst ourselves and say, okay, does this do the trick. Does it cap, in the end does it provide a vehicle to give the benefit of the doubt to that subgroup of workers that were unmonitored that could have gotten high end exposures. If we come away with, yeah, I think it does, that’s the end of the story. Otherwise, we’ll come back and say, no, I don’t think it does. So we really, we can’t achieve closure in one step. It’s going to take a couple of steps.

**DR. ROESSLER:** So the first step is for you to come up with your questions.

**DR. MAURO:** Questions, and then we’ll be home, then we’ll be on our way to closure.

**DR. OSTROW:** Issue 19, we discussed that already. This is the work hour business.

**ISSUE TWENTY**

Twenty, this is the same issue we discussed also, I think, with issue 11 and 15, geometric mean business versus the, distribution versus 95th percentile.
DR. MAURO: Yeah, and it’s in this place where you do say, yes, we agree. We need to revisit this question, so here’s the place where --

DR. NETON: Where you describe the document against these questions.

DR. MAURO: Yeah, this is right. So there is no issue regarding number 20. I think NIOSH agrees that, yes, we need to revisit this in light of the new policy as articulated in the OTIB.

**ISSUE TWENTY-ONE**

DR. OSTROW: Twenty-one, and this is basically the confidence of uncertainty analysis, I think is the same as issue 12 which we’ve covered already. I think the answer to this is that if the 33 MAC or the new bioassay data is good, then you don’t need confidence of uncertainty analysis if you can get yourself that these are really the maximum doses that people can, exposures people can get, then you don’t need to do the uncertainty analysis. This goes away, issue 21.

**ISSUE TWENTY-TWO**

Finally, issue 22 is the outdoor
doses. Here I had misstated. I said the site profile doesn’t address missed occupational and environmental doses to workers, and it actually does. I was used to the other site profiles where they have a separate section for environmental. In re-reading it more carefully, the TBD, it’s there, but it’s blended in with the other stuff. It’s not like really separated out.

And this is like we discussed before, the environmental outdoor stuff, where all the piles of ore, waste piles, accounted for? Whether, was the incinerator outdoor, the incinerator that was --

**MS. BLOOM (by Telephone):** Excuse me, somebody’s turning papers near the microphone.

**DR. OSTROW:** I’ll repeat that we discussed this already. The issue is are all the sources taken into account, the burlap bags, the ore, the waste? Is there an incinerator onsite? Was there an incinerator onsite? When did it operate? Sort of these issues. Were the sources identified and accounted for correctly?

That’s it.
DR. ROESSLER: Well, if you’re satisfied with 22, then are there any other issues that we need to bring up to complete this?

DR. OSTROW: Arjun, did you have anything to bring up?

DR. MAKHIJANI (by Telephone): I was gone for a few minutes so I don’t know what all came up, but just I came back late after the break. But the ore concentrate question in my memory from the Fernald ore concentrate processing time, the Thorium-230 seemed to go along with ore concentrates or the radium got left behind. Now, was that not the case at Linde?

MS. BLOOM (by Telephone): I believe what I’ve seen is that once you get to U-02, you might have a little bit of thorium left there, less than a half a percent by activity from what I’ve seen in documents. And that we’ve already agreed to go back and look at that again.

DR. MAKHIJANI (by Telephone): Yeah, I think if it’s U-02, I would agree with you. I sort of read concentrates, and so it came to my mind.
MS. BLOOM (by Telephone): No, it’s U-02 after 1947.

DR. MAKHIJANI (by Telephone): Okay, yeah, I think some verification on that point would be very important. And sorry that I missed that you’d already said that.

MS. BLOOM (by Telephone): That’s okay.

DR. ROESSLER: Is there any other question or issue?

(no response)

DR. ROESSLER: It seems like what we need to do now is put this on paper, and I’d appreciate some help from some of you as to what we resolved on each issue. The steps that I see are that SC&A are going to prepare their questions on the TBD Table 13 and 36, deliver these to NIOSH. And then NIOSH has a whole bunch of assignments. Cindy has committed to a lot of things.

MS. BLOOM (by Telephone): You better not say that. You’re going to get me in trouble, Gen.

DR. ROESSLER: I heard you say it over and over. What we need to get down on paper is
what you committed to. And I think the important thing is then to look at a timeframe, what’s reasonable to expect from SC&A on their questions to deliver to NIOSH. And what does NIOSH think that the timeframe would be to re-evaluate all these issues. Really they’re several, one big one, and then maybe some better documentation then.

Does anybody have any comments? I think this we owe to the Board and the people on the telephone.

**DR. BEHLING:** Who’s going to do the analysis of the bioassay? Because I consider that the single most important issue.

**DR. NETON:** We’ll do that.

**DR. ROESSLER:** Do you have some feeling for a timeframe on it?

**DR. NETON:** Well, I think we need to talk among ourselves. I don’t want to give a timeframe right now. If we put out maybe a draft of what these action items are, we could fill it in. I need to talk to Cindy and workloads and the issues on the table right now.

**DR. ROESSLER:** So we will work together then
on the issues.

**DR. NETON:** I wish I could give you a timeframe now but I’m not prepared to do that.

**DR. ROESSLER:** Perhaps by the next Board meeting or Board phone call we can have that.

**DR. NETON:** Well, certainly well in advance of that, the Board call, by April 5th.

**DR. ROESSLER:** That sounds reasonable.

**DR. BEHLING:** Is the intent, Jim, to use the bioassay data as a way of replacing the air sampling data --

**DR. NETON:** Yes.

**DR. BEHLING:** -- or to confirm the air sampling data?

**DR. NETON:** No, the ultimate intent would be to use it to replace the air sampling data if we can determine that it’s a valid set, and it’s a lognormal and all the good caveats that go along with that. And if that does, then many of these issues drop off the table. But I need to talk to Cindy and the others to figure out how much time she has. It takes longer to construct one of these coworker sets than one would think even though we’ve done it many, many times there’s a lot of issues to
deal with.

DR. MAURO: From my perspective in terms of communicating back to NIOSH the questions we have so that we could fully appreciate Table 36 and the whole, that might work, rather than try to write it down, is it possible that we could have our reviewers talk to your people directly and say, okay, I don’t understand how you got this number. Could you walk me through it? And that might be a lot easier, just one phone call, may last an hour or two.

And once we have a full appreciation of, okay, I think I understand what was done, then what we can do is perhaps put an e-mail out to the working group that says, okay, we understand. Here’s the answer. And then we can also say something about whether or not the follow on issues are concerned or have been resolved.

In other words I understand what they did, and I think they’ve captured the high end group. Or I understand what that did, and I don’t think they captured the high end group. But at least we’ll be able to get it to that point, and then we’ll deliver that to you and
the rest of the working group.

**DR. ROESSLER:** It sounds like in priorities with time it seems like that would work best.

**DR. MAURO:** I thing that can go pretty quickly.

**DR. OSTROW:** Well, John, I think we have to write it down though first even before the teleconference.

**DR. MAURO:** No, among us, yeah.

**DR. OSTROW:** I think it would be probably rather than spring it on the --

**DR. MAURO:** Okay --

**DR. OSTROW:** -- we should send them a copy and say we don’t waste time that way.

**DR. NETON:** You can coordinate with Chris.

**DR. OSTROW:** Because a lot of this stuff is very specific like what did you mean in the third sentence of this paragraph.

**MR. ELLIOTT:** Yeah, I think if you could get it said in advance it would certainly prepare us to be more responsive in the time you’d have to spend together on the phone.

**DR. WADE:** The Chair can be on the telephone call if you’d like.

**DR. NETON:** Yeah, the working group members
are invited to participate in these calls but not required, at least that’s the way it’s been in the past.

DR. ROESSLER: So is there anything else we need to consider, Lew or Emily?

DR. WADE: I think it’s an activity and then maybe during the April 5th call you can do a little bit better forecasting to the Board as to what they might expect when you do your work group report. But it was a very productive day.

I think you did a masterful job of leading the folks here.

DR. ROESSLER: Pushing them.

DR. WADE: Would they were all this smooth.

DR. ROESSLER: Then I think we’re adjourned.

(Whereupon, the working group meeting concluded at 3:15 p.m.)
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 March 26, 2007; 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 22nd day of July, 2007.

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