

1 for making a decision.

2 **DR. ROESSLER:** I say work through lunch and get
3 done before midnight.

4 **MR. HINNEFELD:** Okay. Well, I think we can do
5 that anyway, but -- I think I'm -- maybe I'm more
6 optimistic maybe than I should be. Okay. Well,
7 we'll worry about the situation in a little while
8 -- in a little bit, and if need be we can always
9 -- like we can always call Subway and run down
10 and pick up some sandwiches.

11 **THE COURT REPORTER:** Well, let me just put in my
12 -- I've got to have something to eat. I've been
13 up since 3:00 and haven't eaten a thing, so I'll
14 need something, intravenous or whatever.

15 **MR. HINNEFELD:** We gave you coffee. What more do
16 you want?

17 I also, Ray, will need to eat some lunch. I get
18 -- if nothing else, I won't feel well for not
19 doing lunch. So we'll have some lunch.

20 **THE COURT REPORTER:** Okay.

21 **MR. HINNEFELD:** Okay. Well, let's just -- I
22 would just propose we go through these in order.

23 **MS. BEHLING:** Yes, that's what we're going to do.

24 **MR. HINNEFELD:** And then you give whatever
25 summary you have and we can talk about anything

1 that we have as well.

2 **MS. BEHLING:** Okay, good. As we said, we're
3 going to try to keep it brief, but I have the
4 first one, which is tab 21, and this is a Rocky
5 Flats case. And in this case, I'll give you just
6 a brief overview to start with and then we'll go
7 through the few findings in this case. The --
8 the employee was a master electrician. He worked
9 from -- let's see here, from '69 through 1990 and
10 he was diagnosed with prostate cancer in 1997.
11 NIOSH estimated a dose of about 57 rem to the
12 bladder and he -- that resulted in a Department
13 of Labor POC of 40.8 percent. Now, we'll just
14 through the findings unless anyone else has any
15 types of questions, but the very first finding
16 that we had, which is on page 9 under the
17 recorded photon dose -- we were not able -- based
18 on the procedure that was used, we were not able
19 to reproduce the photon dose. In fact, we -- in
20 Section 2.1 -- were able to calculate -- we
21 actually gave you the equation and showed exactly
22 what the dose reconstructor did in calculating
23 that dose. And in some cases, we were able to
24 reproduce it. And there were actually eight
25 entries in which -- in which we could not

1 reproduce the 30 to 250 keV photon dose, and
2 eight entries which we couldn't reproduce the low
3 energy photon dose. And it just so happened that
4 the -- see, in each case, the 30 to 250 keV
5 photon dose was an underestimate, and the less
6 than 30 keV photon dose was an overestimate and I
7 assume it was an arithmetic mistake, but we just
8 could not reproduce those.

9 **MR. HINNEFELD:** Well, I -- I -- I think I know
10 what the -- what the dose reconstructor did to
11 get to the numbers he got, and I don't know if
12 it's correct or not because I haven't had a
13 chance to sort out exactly the Rocky Flats
14 Technical Basis Document, the various reports.
15 But I brought along a couple sheets of paper that
16 are from this case. The two different ways of
17 describing the exposure history is the first.
18 This is the one that you provided.

19 **MS. BEHLING:** Yes.

20 **MR. HINNEFELD:** And then these sheets also relate
21 to the same person and they're also in -- in the
22 DOE response for this case. And these are
23 individual -- well, at some point they're annual
24 summaries and then they break into badge readings
25 that -- in some year. And this sheet -- and this

1 sheet with the handwritten numbers shows
2 penetrating number and a skin number. The
3 printout from the record shows deep dose
4 equivalent/shallow dose equivalent, hyphen skin,
5 and then has an additional neutron column on the
6 right side. And what we noticed was whenever
7 there was a neutron recorded on this sheet, it
8 was added to the DDE penetrating on the -- or DDE
9 on this same sheet to get 24, and you got the
10 value on the handwritten sheet. So at some point
11 they added the neutron deep and this DDE value
12 together, or they broke the neutron out of the
13 original number and -- and recorded it that way.
14 So it was -- it was a difference in the two
15 reporting, so what the dose reconstructor did was
16 take the difference between this DDE and SDE skin
17 to get the 30 keV and then do the arithmetic as
18 described in your review.

19 **MS. BEHLING:** Okay.

20 **MR. HINNEFELD:** Now, that's the difference. I
21 don't know which one is the right -- the way it's
22 supposed to be done. Okay.

23 **DR. BEHLING:** And -- and for the record, some of
24 these things will result in very trivial
25 differences and I think we should have started

1 out by saying that our audit was first to see can
2 we reproduce it based on the information
3 provided, and we didn't really say whether or not
4 that would result in any even significant dose.

5 **MR. HINNEFELD:** Right.

6 **DR. BEHLING:** It's just whether or not we could,
7 and understand the process.

8 **MR. HINNEFELD:** Uh-huh.

9 **DR. BEHLING:** And -- and of course, you know, as
10 you see in almost all the cases here, our
11 findings result in impacts that are very low,
12 meaning that it has a very modest effect on dose
13 and certainly not on the POC. And I just want to
14 be on record for saying that we're not saying
15 these are monumental issues; it's just that our
16 attempt to reproduce them, these numbers, based
17 on information provided in the text, did not
18 allow us to do that --

19 **MR. HINNEFELD:** Right.

20 **DR. BEHLING:** -- regardless of whether or not
21 there was a significant difference in our -- our
22 dose assessment.

23 **MR. HINNEFELD:** Well, I would hope that before --
24 you know, before you leave Thursday or Friday
25 I'll be able to sort out the various reporting --

1 these two different reports from Rocky Flats and
2 which is the appropriate way to -- which is the
3 appropriate subtraction. Because it's not clear
4 to me today which one is the appropriate way to
5 do it.

6 **DR. BEHLING:** Yes, yes.

7 **MR. HINNEFELD:** Whether it's subtract these
8 numbers or subtract those numbers.

9 **DR. BEHLING:** And -- and I think we will see that
10 later on, too. The methodology for reporting
11 doses changed over the years. You will see --
12 early on you see penetrating dose and non-
13 penetrating doses. And of course, the skin dose
14 would be the summation of penetrating/non-
15 penetrating. And oftentimes later on you would
16 throw in slow neutrons, fast neutrons, and even
17 X-rays. And so the methodology for reporting
18 doses changed over the years.

19 **MR. HINNEFELD:** Right.

20 **DR. BEHLING:** And -- and sometimes when you look
21 at the composite annual doses, you don't get a
22 full understanding of what really went into those
23 until you get to the actual cycle itself,
24 individual reporting, that you get to understand
25 how these numbers came to be.

1 **MR. HINNEFELD:** Right.

2 **DR. BEHLING:** And -- and, you know, as I said, in
3 most instances these are quite trivial.

4 **MR. HINNEFELD:** And these are small differences.

5 **DR. BEHLING:** Yes.

6 **MR. HINNEFELD:** These particular differences are
7 pretty small. Yeah. Okay.

8 **MS. BEHLING:** Okay. The second finding -- and
9 this is under missed dose on page 10 of tab 21.
10 And this is one of these issues that we seem to
11 encounter a lot of times when we're dealing with
12 procedures such as the TIB-10 and TIB-8
13 procedures. And in this particular case, we're
14 really not sure. What -- what we feel the dose
15 reconstructor should have done if they wanted to
16 maximize the missed photon dose was to take the
17 LOD value times N exchange periods and enter that
18 into IREP as a constant with no uncertainty.
19 However, what was entered was a -- what appears
20 to be a geometric mean with a geometric standard
21 deviation of 1.52. And this is something that we
22 see on a routine basis on -- in this particular
23 area, especially with missed photon dose.

24 **MR. HINNEFELD:** Right.

25 **MS. BEHLING:** When they use the LOD value and --

1 times the N, that is already your 95th percentile
2 value and should be entered as a constant without
3 the uncertainty.

4 **MR. HINNEFELD:** Yeah, and that's -- I guess my
5 comment on this was that's -- you're correct, and
6 that since this was an error in the high dose
7 side on a non-compensable outcome, we wouldn't
8 necessarily correct it. We might -- we would
9 just send it on.

10 **MS. BEHLING:** Okay.

11 **MR. GRIFFON:** On that -- on that -- along those
12 lines of missed photon dose, it's not so much the
13 uncertainty, but I had a question on this case of
14 missed versus unmonitored. And in 1972, '78,
15 '81, '82, '85 -- if my notes are right here --
16 there was no data. And I was -- I didn't have a
17 chance, but either -- this is either SC&A or to
18 NIOSH, did the dose reconstructor just assume it
19 was a missed dose and a -- and assign the LOD
20 over two, or whatever technique, or did they
21 assume it was unmonitored and assign some other
22 value like co-worker data or something like that?

23 **MR. HINNEFELD:** My -- my judgment on this is
24 since this employee went from monitored to
25 unmonitored and -- and then back to monitored on

1 a -- what seems to be a relatively consistent
2 work assignment, that there were certain years
3 when he would just not get assigned to places
4 where he needed a badge. And in those cases, the
5 -- the missed dose of a badged person we would
6 consider an upper estimate or a bounding estimate
7 on what the person's exposure might have been for
8 those years, and so it would be an appropriate
9 way to -- to do the unmonitored. Yeah, he was --
10 there were a handful of years where he does
11 appear to be unmonitored, given this work
12 situation and particularly given '81, '85, you
13 know, that work era --

14 **MR. GRIFFON:** Yeah.

15 **MR. HINNEFELD:** -- we would say that okay, well -
16 - if he -- since he was unmonitored, he would no
17 more dose than someone who was monitored all the
18 time and had zeros, you know --

19 **MR. GRIFFON:** Right.

20 **MR. HINNEFELD:** -- every cycle and all that. So
21 it's an appropriate bounding dose for those
22 years.

23 **MR. GRIFFON:** Okay. I guess what I -- what I was
24 wondering is, was there any attempt to find out -
25 - I don't know if the person in this case is

1 alive, but was there any attempt to find out from
2 the CATI interview whether he did go on and off
3 badging like that or was there anything in his
4 work history that would have dictated necessarily
5 -- my -- my concern, again, is that if -- if
6 there's data missing, how do we know it was
7 simply that he got off the monitoring program and
8 not that data is just simply missing and for
9 whatever reason -- a lost badge, a whatever.

10 **MR. HINNEFELD:** Okay.

11 **MR. GRIFFON:** There's really no way to verify
12 that I guess, or --

13 **MR. HINNEFELD:** I don't know of any way right
14 now. We certainly read the CATI. I don't -- I
15 haven't read it recently, but certainly the dose
16 reconstructor would have read the CATI and our
17 reviewer would have read the CATI and probably
18 would have, and should have, commented and the
19 dose reconstruction -- or the dose from the
20 incidents would have reflected some sort of --
21 you know, something saying then that he was
22 continuously monitored but -- but that it's
23 missing for some years or -- it would seem like
24 it would have been annotated in some fashion. I
25 don't recall sitting here today because I -- I

1 don't know that I actually read it when I was
2 preparing for this. Certainly the dose
3 reconstructor would have done it and our reviewer
4 would have read it. I just felt like with this
5 person's assignment being an electrician, and
6 presumably working all over --

7 **MR. GRIFFON:** Right.

8 **MR. HINNEFELD:** -- you know, he could be assigned
9 to, you know, clean side maintenance. I mean
10 there was a -- Fernald was a clean side
11 maintenance and while Fernald and Tippy (sic)
12 were badged for most of the history -- well,
13 everybody was badged, but you just didn't go in
14 the process area. They only worked maintenance
15 on the clean side. So I would suspect it would
16 be consistent with that kind of approach.

17 **MR. GRIFFON:** It could well be. I'm -- I'm just
18 asking whether that was checked or not.

19 **MR. HINNEFELD:** Yeah. I'd say -- I'd say, to
20 answer your question, our approach would be -- in
21 a situation like this, we would probably conclude
22 that assigning a missed dose rather than a
23 monitored dose for this kind of situation would
24 be an appropriate bounding approach.

25 **MS. BEHLING:** Okay. We'll move on into finding

1 3, which is missed neutron dose section on page
2 12. In this case, the dose reconstructor
3 specified the formula that he was actually
4 following for calculating missed photon dose,
5 which was N for the badge exchanges times LOD
6 over two times two times 1.91. And this
7 methodology is not endorsed in either the
8 implementation guide or the Technical Basis
9 Document. And here again, he had two options.
10 If he was going to maximize that missed dose, he
11 would have followed the N times LOD formula and
12 entered it into IREP as a constant. Or, if he
13 wanted to use the best estimate approach, he
14 would have used N times LOD over 2, entered that
15 as geometric mean with standard -- geometric
16 standard of deviation of 1.52.

17 **MR. HINNEFELD:** Yeah. Same comment as before,
18 that since it's an error on the high dose side on
19 a non-compensable case, we wouldn't necessarily
20 correct it.

21 **MS. BEHLING:** Okay. Finding 4 has to do with the
22 occupational medical dose. And here there was
23 what we felt an underestimation of the dose,
24 because apparently the dose reconstructor only
25 calculated one chest X-ray for 1969. And I -- if

1 I recall, I think the dose reconstruction
2 indicated that he was going to assume an annual
3 chest X-ray, which he did not do and that would
4 have resulted in additional 7 or .700 millirem.

5 **MR. HINNEFELD:** Okay. Now, in this case, they
6 did use the -- the tables from the site profile
7 on these dose numbers. But 33 millirem was
8 assigned in 1970, right, the first year of
9 employment? Isn't that where we are on this one?
10 The table on the appendix would be --

11 **MS. BEHLING:** Yeah.

12 **MR. HINNEFELD:** -- where it would be. In line
13 212, line 212 of the dose reconstruction.

14 **MS. BEHLING:** Yeah, I -- I didn't have that
15 information on this one. I don't know why.

16 **MR. HINNEFELD:** Line 212 of the dose
17 reconstruction is the 33 millirem and then
18 there's a whole series of zeroes --

19 **MS. BEHLING:** Yes.

20 **MR. HINNEFELD:** -- after that. On the Technical
21 Basis Document for Rocky Flats -- this is the
22 medical section -- there's the -- this is later
23 years. Here's '70 to '85 and there's pre-'70 for
24 a PA chest and --we're looking at bladder --
25 right? -- urinary bladder for the surrogate.

1 Isn't that what we're doing here? Urinary
2 bladder?

3 **MS. BEHLING:** Yes.

4 **MR. HINNEFELD:** So pre-'70 we have a 25 millirem
5 --

6 **DR. BEHLING:** And you multiply it times --

7 **MR. HINNEFELD:** Times 1.3, which gives us the 33
8 for that entry.

9 **MS. BEHLING:** Yes. Yes.

10 **MR. HINNEFELD:** Okay. When you get to '70 --

11 **MS. BEHLING:** Through '84?

12 **MR. HINNEFELD:** -- '70 to '85, urinary bladder
13 goes to less than a millirem. So even with the
14 1.3 multiplication, it will be -- it will be less
15 than one, and IREP rounds to the nearest
16 millirem, so it appears as a zero. Now on the --
17 appears as a zero on this printout. Now if you
18 open the SL workbook that is actually the IREP
19 input and you highlight that field, you'll see
20 that it's not actually a zero. It's actually a
21 calculated value based on some -- and just is
22 less than one so it rounds down to zero in the
23 IREP printout. So from -- for the years, except
24 for the first year, the numbers for -- you know,
25 the medical dose based on the TBD are less than

1 one, so you get all those zeros down there.
2 Okay. And that also explains the arithmetic, why
3 the dose reconstructionist assigned a total of
4 like 38 millirem for this report -- medical
5 exposure -- when in fact you only can see the 33
6 on the -- on the spreadsheet.

7 **MS. BEHLING:** Yes.

8 **DR. BEHLING:** And (unintelligible).

9 **MS. BEHLING:** Right.

10 **MR. HINNEFELD:** Yeah. Now -- and then there's
11 another comment about the lumbar spine exam,
12 which is way down at the end. It's line 234 of
13 the dose reconstruction, his lumbar spine. The
14 dose reconstructor appears to have shortcut it
15 and on a -- on a high side, which would be
16 assigned as a -- as the lumbar spine. The
17 Technical Basis Document says they had a two-view
18 lumbar spine, an AP and a lateral. And he gives
19 a value for both the AP and the lateral on the
20 lumbar spine in the -- in the years when they
21 were given, '52 to '74, so you may want to give
22 him higher if you want to give him anything. And
23 the urinary bladder, as you can see, is -- you
24 have an AP value and these are lung only, and
25 then a lateral number. The dose reconstructor

1 just took two AP.

2 **MS. BEHLING:** Uh-huh. I see.

3 **MR. HINNEFELD:** Two times the AP value and kept
4 that GSD rather than, you know -- your other
5 alternatives would be list them on separate lines
6 or do a combination of these two means and then
7 geometric -- you know, some sort of combination
8 of the distribution.

9 **MS. BEHLING:** No. No, we didn't --

10 **DR. BEHLING:** I -- I think I did make a comment
11 later on about the lumbar spine as it's being
12 calculated here versus for Iowa, which is like a
13 factor of ten higher, and I couldn't figure out
14 why one --

15 **MR. HINNEFELD:** I'm not sure -- see, I can --
16 yeah, that was in the Iowa I think.

17 **DR. BEHLING:** Yeah. Yeah, I think they go up to
18 like 2.9 rem --

19 **MR. HINNEFELD:** As I recall, it had to do with
20 the number of views.

21 **DR. BEHLING:** Yes.

22 **MR. HINNEFELD:** Certain places took like five
23 views for the lumbar spine, and that I think is -
24 - explains the magnitude of the difference. And
25 this was -- so in this case, the lumbar spine was

1 counted for as if it were two AP's as opposed to
2 an AP and a lateral. I think the dose
3 reconstruction incorrectly says they accounted
4 for two lumbar spine exams. And they didn't have
5 two lumbar spine exams, they did two views.

6 **DR. BEHLING:** Views.

7 **MR. HINNEFELD:** So that's -- so that's part of
8 the comment (unintelligible).

9 **DR. BEHLING:** Yeah.

10 **MS. BEHLING:** Okay.

11 **UNIDENTIFIED:** This is yours, too.

12 **MR. HINNEFELD:** Oh, yeah. Sorry. I need just a
13 few more things in front of me.

14 **MS. BEHLING:** All right. And finding number 5 is
15 we could not reproduce -- based on the
16 information that was provided in the dose
17 reconstruction report, we could not reproduce the
18 on-site ambient dose. I believe NIOSH calculated
19 73 millirem, and based on using the Technical
20 Basis Document, we calculated 202 millirem. No.
21 No, I'm sorry. We did not. We calculated 60
22 millirem.

23 **MR. HINNEFELD:** Yeah, there's two.

24 **MS. BEHLING:** Sixty, yes.

25 **MR. HINNEFELD:** Yeah.

1 **MS. BEHLING:** Trivial, however -- as Hans said --
2 one of the things we're trying to do is just
3 reproduce all of the numbers.

4 **MR. HINNEFELD:** Okay. What I think they did was
5 took the 1985 dose from their -- from the TBD
6 table and they used the 1985 dose of -- is that
7 the highest one? I may have these wrong -- 1989
8 dose. 1989 dose had the highest mean value of
9 167 and the recommended 1 sigma value is this
10 value all the way over here.

11 **MS. BEHLING:** Yeah, 36 and 39.

12 **MR. HINNEFELD:** So if you add those two, 167 and
13 2 sigma 78, you get 245 for an 1860-hour year,
14 and that's 73 millirem for the 26-hour -- 26-hour
15 work period. So that seems to be how they did
16 the arithmetic. Again, the number is trivial and
17 it doesn't really matter.

18 **MS. BEHLING:** It is.

19 **MR. HINNEFELD:** But that seems to be how they did
20 (unintelligible).

21 **MS. BEHLING:** Okay. Okay. And then the last
22 finding is with regard to the internal dose. And
23 in this particular case, and I know that dose
24 reconstructors do this a lot when they're
25 maximizing the hypothetical internal dose, they

1 use the TIB-2 when they select the 28
2 radionuclides for the hypothetical internal.
3 However, since Rocky Flats is a facility without
4 a reactor, procedurally they should have selected
5 the model with the 12 radionuclides, which would
6 have obviously reduced the internal dose.

7 **MR. HINNEFELD:** Yeah, you're right.

8 **MS. BEHLING:** I believe that's it for this one.

9 **MR. GRIFFON:** Can I -- yeah, just one more thing
10 on this. Not to beat a dead horse, but I -- this
11 is my horse to beat. I'm looking at the CATI
12 interview with this guy, and -- and Stu, I mean
13 he is an electrician, but there's also a
14 statement in here that says he was -- he did odd
15 jobs until he became a -- got his license --

16 **MR. HINNEFELD:** Okay. All right.

17 **MR. GRIFFON:** -- as a master's electrician --

18 **MR. HINNEFELD:** That's right. That's right.

19 **MR. GRIFFON:** -- and then he worked on -- did
20 glove box work in 7/71.

21 **MR. HINNEFELD:** Glove box maintenance, sure.

22 **MR. GRIFFON:** Now, did he -- was he assigned
23 there permanent -- you know, I mean, is there --
24 is there a black line or is it -- did he go back
25 and forth? I don't know. It seems like he's

1 saying I did odd jobs to a certain point, then I
2 was a master's electrician, then I was assigned
3 to glove box work. Maybe it's not that clean,
4 but I -- I just wondered if --

5 **MR. HINNEFELD:** I believe probably our
6 interpretation was that he at times did
7 maintenance on things in glove boxes.

8 **MR. GRIFFON:** Right.

9 **MR. HINNEFELD:** Electrician work on things in
10 glove boxes --

11 **MR. GRIFFON:** Right.

12 **MR. HINNEFELD:** -- as part of his master
13 electrician assignment.

14 **MR. GRIFFON:** Yeah.

15 **MR. HINNEFELD:** And so --

16 **MR. GRIFFON:** But that doesn't necessarily mean -
17 -

18 **MR. HINNEFELD:** -- our approach would be that
19 that comment or that information would not
20 necessarily cause us to change the judgment that
21 I described early on.

22 **MR. GRIFFON:** Okay. I -- I was just -- you know,
23 the other note that I have was I don't think
24 there's any original records of -- of -- they're
25 all annual summary records, right, for the --

1 **MR. HINNEFELD:** For the dose, you mean?

2 **MR. GRIFFON:** -- exposure data. Yeah.

3 **MR. HINNEFELD:** There is actually the printed
4 page from the person's record that actually
5 includes -- after a particular year, and I forget
6 what it is, '78 or '79. After that year it shows
7 what appears to be monitoring cycle by monitoring
8 cycle. So the printed -- you know, it looks like
9 a printout from a computer database --

10 **MR. GRIFFON:** Uh-huh.

11 **MR. HINNEFELD:** -- does in fact show that. The
12 early on is annual summary even on that report.
13 The handwritten numbers are annual summaries.
14 But that report does seem to show what appears to
15 be monitoring cycle by monitoring cycle. It
16 usually is like a quarter or every couple months
17 or something like that, and it's got an unusual
18 nomenclature becau-- or unusual designation
19 because it has two dates, activity start and
20 activity end, which you normally think would be
21 start of the wear period and end of the wear
22 period, but it's not. It's like the day before
23 and the day after the -- the badge was collected.
24 So -- and those things are only like a day apart,
25 so it's a little bit -- kind of throws you off

1 but the Technical Basis Document does actually
2 describe that report in that fashion and it's --
3 so it's a little unclear what the start of each
4 wear period was, but it's pretty clear what the
5 end of each wear period was.

6 **MR. GRIFFON:** But again, this may not be that
7 critical in this case, but in -- in general, I --
8 I guess one concern is if you have the -- if you
9 have borderline -- if we run up against
10 borderline cases, I think -- because we've heard
11 so many stories about people being asked to put
12 their badge down to do certain work or whatever.

13 **MR. HINNEFELD:** Yeah. Yeah.

14 **MR. GRIFFON:** So it -- it would make sense in
15 those situations to maybe go back and ask the
16 person. Often they're not going to remember
17 because --

18 **MR. HINNEFELD:** And in fact, that person actually
19 has a different problem than the one you're
20 describing, because the one you're describing,
21 he'll have exposure on it.

22 **MR. GRIFFON:** Right.

23 **MR. HINNEFELD:** It will -- he won't look like an
24 unmonitored person; he'll have an exposure
25 record. And so it's another issue and we look

1 for that comment.

2 **MR. GRIFFON:** Yeah. Yeah.

3 **MR. HINNEFELD:** And we -- and we don't just
4 ignore that comment when we see it.

5 **MR. GRIFFON:** Okay. Right, right.

6 **MR. HINNEFELD:** In this particular case, if the
7 person has no record for monitoring, we kind of
8 go with the -- the site in general, how -- how
9 they seem to, you know, badge people and not, the
10 -- the era. You know, if you're well into the
11 '80s, we have a little more confidence. So if a
12 guy doesn't have an exposure record in the '80s,
13 he probably wasn't monitored that year --

14 **MR. GRIFFON:** Right. The one that really caught
15 my eye on this situation -- the one that caught
16 my eye was the '72 because he had --

17 **MR. HINNEFELD:** There was one in '72. Right.

18 **MR. GRIFFON:** He had his higher exposure in '69,
19 '70, then there was a -- like a blank and then it
20 went one more high year, and then it kind of
21 lowered, you know, tailed off.

22 **MR. HINNEFELD:** Right.

23 **MR. GRIFFON:** In the '80s like -- yeah, I agree.
24 It wouldn't surprise me that much. But anyway,
25 I'll leave it at that.

1 **MR. HINNEFELD:** Okay.

2 **DR. BEHLING:** Okay, kind of move this through,
3 we're on tab 22, the next case, which is case
4 number 10610. This is an individual who worked
5 at Y-12. And if I can just quickly go through it
6 here, it's a female worker who worked there from
7 1980 through 1998 for a period of about 19 years,
8 and this person was diagnosed with breast cancer
9 in the year 2000, shortly after she terminated
10 employment. Her job at Y-12 was a machine
11 cleaner, so she was in contact with materials
12 that may have involved external as well as
13 internal exposures. The total assigned dose to
14 this individual was 31.85 rem. And for her
15 breast cancer that translates to a POC value of
16 32.13 percent. And just quickly going through
17 Table 1 on page 5 of the report you'll obviously
18 come to some conclusions just looking at the
19 doses. She had very little measured doses. Most
20 of the external dose was assigned to her from
21 photon missed dose. So she had a total of only
22 26 millirem of measured dose and a total of 6.84
23 rem of photon missed dose. And she received
24 quite a bit of exposure from electron missed
25 dose, which was also calculated. And on top of

1 it, a very, very hefty dose from internal
2 exposures that was based on a hypothetical model.
3 So again, the -- the doses are -- in most
4 instances here, the overwhelming majority of dose
5 contributing to her 31.85 rem were -- were
6 basically assigned doses for missed doses, as
7 well as hypothetical internal.

8 Let me just point out an -- an error. I don't
9 know if Kathy had sent you an errata sheet, but
10 in Table 2, our case review list, for -- for the
11 category of C.2.2, missed dose. You should have
12 had a no and a low instead of the yes, and that
13 is exchanged with value C.3.2 where we had the --
14 the no and low, and you should have a checkmark
15 on your yes. So it's a reversal of those two.

16 **MS. BEHLING:** Same number of findings.

17 **DR. BEHLING:** Same -- same findings.

18 **MR. HINNEFELD:** Yeah, okay. I got it.

19 **DR. BEHLING:** Again, if you look at the bottom of
20 that checklist, we find eight findings. The
21 majority of them had low impact, but there were a
22 couple of instances where we concluded that we
23 can't really identify what the impact is. And so
24 they were category 4 under review, and we'll
25 briefly talk about that when we get there. Let

1 me just quickly focus on the findings.
2 The first finding is identified on page 10, and
3 it's misinterpretation of procedure resulting in
4 improper assignment of uncertainty for missed
5 dose. And again, this is one of those cases that
6 I think we're going to be hearing again and
7 again, and then Stu is going to say enough, I
8 heard. This is the misinterpretation of TIB-8
9 and 10 where people are looking at those tables
10 and confusing what needs to be done in maximizing
11 doses based on recorded dose versus missed dose.
12 And here they -- again there's three things that
13 they do. They multiply -- they used N times LOD,
14 which should be enough if you're going to
15 maximize missed dose, and -- and what they do is
16 they multiply it by 2 and then they introduce
17 implementation guide number 2, which divides by
18 2. And then they obviously still have the
19 uncertainty, so you have three errors. So you
20 have the multiplier, a -- a correction --
21 standard correction factor which does not belong.
22 They correct that by dividing by two, so error
23 one -- number one is corrected by error two, and
24 you're left with error number three, which is
25 uncertainty which doesn't belong. And that is

1 the routine error that has been made. And, you
2 know --

3 **MR. HINNEFELD:** Which I -- I still think they
4 made one error which --

5 **DR. BEHLING:** They made one error.

6 **MR. HINNEFELD:** -- which was adding the -- which
7 included the multiplier of 2 which didn't belong.
8 You know, they -- and then -- and then the
9 language that they chose to describe what they
10 did kind of leads me to believe --

11 **MS. BEHLING:** That's the other thing. The
12 language sometimes --

13 **DR. BEHLING:** You can either do it two way. You
14 can say the multiplier 2 doesn't belong.

15 **MR. HINNEFELD:** Doesn't belong.

16 **DR. BEHLING:** Or you can say the multiplier and
17 the divider doesn't belong, which leaves it with
18 LOD as a -- as a constant. So -- so you can do
19 it in either direction, but -- and I -- I've gone
20 on record in saying that when I read those two
21 Technical Information Bulletins I, too, was
22 confused until I realized that table needs to be
23 segregated that says this is for recorded dose;
24 this is for missed dose.

25 **MR. HINNEFELD:** I -- I at least agree with you, I

1 mean unless somebody around here can change my
2 mind. But I at least agree with you on your
3 reading of this document.

4 **DR. BEHLING:** Yeah, yeah. And this is a
5 constant. It's one that we routinely -- so we
6 want -- the next time, we'll just say this is,
7 you know, something we've already discussed.
8 The next finding, finding 22.2, C.2.2, that
9 should also have inappropriate assumption used
10 for calculating not recorded dose but missed
11 photon dose. The word "recorded" should be
12 replaced with "missed photon" dose. Again, here
13 -- and I don't want to come across as not being,
14 you know, claimant-favorable, but my assumption
15 is always when you have the real data, use it.
16 Don't necessary (sic) -- even if it's claimant-
17 favorable, and in this case we -- we talk about
18 12 cycles per year as the number of cycles for
19 calculating missed dose. But if you look at the
20 individual dosimetry records, the first number is
21 monitored on a quarterly basis. So use the
22 quarterly, and obviously it's going to reduce the
23 dose and won't be as claimant-favorable, but --
24 but it's the real information and should be used.
25 (Whereupon, Mr. Gibson enters the

1 proceedings.)

2 **MR. GIBSON:** Hello.

3 **MR. HINNEFELD:** Hey, Mike.

4 **MS. BEHLING:** Hello.

5 **DR. BEHLING:** Okay. The next one is page 12,
6 finding 22.3, D.1.1, incorrect procedure used to
7 estimate electron dose.

8 **MS. BEHLING:** Can I stop you for just one second?
9 Can I assume that on this -- on the finding 2,
10 you're in agreement with the fact that we feel
11 that that is an overestimate --

12 **MR. HINNEFELD:** Yeah.

13 **MS. BEHLING:** Oh, okay.

14 **MR. HINNEFELD:** Yeah.

15 **MS. BEHLING:** Just want to be sure.

16 **MR. HINNEFELD:** That's just, you know, as a -- as
17 a matter of course, if we see an overestimate in
18 a -- in a noncompensable case, even more so than
19 needs to be there, we'll --

20 **MS. BEHLING:** Just let it go.

21 **MR. HINNEFELD:** -- just let it go, sure.

22 **MS. BEHLING:** Okay. And we don't.

23 **MR. HINNEFELD:** Yeah. Right.

24 **DR. BEHLING:** The -- the -- as I said, the next
25 finding is on page 12, and it's finding 22.3,

1 D.1.1, incorrect procedure used to estimate
2 electron doses. The reference cited was ORAU-
3 OTIB-0008 for reconstruction of missed shallow
4 dose. That procedure basically tells you you
5 cannot use this for measuring a skin dose or
6 shallow dose. It's one of the statements up
7 front. In essence he should have used TIB-17 as
8 -- as the correct one.

9 **MS. BEHLING:** For the breast.

10 **DR. BEHLING:** Yeah, for the breast.

11 **MR. HINNEFELD:** Right.

12 **DR. BEHLING:** Just a technical oversight.

13 Finding 22.4, LOD value could not be verified. I
14 think the individual used 40 millirem. And of
15 course if you use TIB-17, the LOD should have
16 been 50. Again, it's a modest difference which
17 would change the dose by about 200 millirem.

18 **MR. GRIFFON:** Let me stop at each one of these.
19 Are -- are you in agreement or...

20 **MR. HINNEFELD:** Yeah, I -- I believe that is one
21 -- I believe that is right. I believe that...
22 yeah.

23 **DR. BEHLING:** Yeah.

24 **MS. BEHLING:** Yeah.

25 **DR. BEHLING:** There's two things that cancel each

1 other out, 40 versus 50, but then I also say it's
2 quarterly instead of 12 cycles. So in essence
3 you actually lose, again, dose. So we're
4 actually talking about dose reduction here if you
5 comply with my -- my statements.

6 The next finding is on page 14. It's 22.5,
7 incorrect selection of hypothetical. We just
8 already talked about that in the previous one.
9 Whenever you have a facility that is not a non-
10 reactor, the correct choice based on TIB-2 is to
11 use 12 radionuclides instead of 28. Again, this
12 would reduce the dose.

13 The next finding is finding 22.6, F.3,
14 hypothetical dose value incorrectly derived. And
15 again, when you look at the hypothetical dose
16 model, it offers here I believe 13 organs that
17 you can select from. And of course that does not
18 allow for all organs that are defined in -- in
19 DC-9 code, which means that when you have an
20 organ that is not among the 13, you're supposed
21 to use a surrogate organ. That is, a non-
22 metabolic organ that would serve as a maximizing
23 dose. I guess the experience has shown that the
24 colon is always the maximal organ for a
25 surrogate, but in this case the person has breast

1 cancer and the breast tissue is among the 13
2 tissues that can be used to identify the real
3 dose. And so based on that, we calculate the --
4 the dose for the breast using the 28
5 radionuclides would have been 8.75 rem which is
6 considerably lower than the ones for the colon.

7 **MR. HINNEFELD:** It was -- I think this is a
8 holdover from the original -- original use of the
9 TIB-2 --

10 **DR. BEHLING:** Yeah.

11 **MR. HINNEFELD:** -- was use the highest non-
12 metabolic.

13 **DR. BEHLING:** Yeah.

14 **MR. HINNEFELD:** Or it's available for -- these
15 non-metabolic organs, use the highest non-
16 metabolic dose, and that was the approach.

17 **MS. BEHLING:** Yes.

18 **MR. HINNEFELD:** And this remains from that. In -
19 - in the interim, TIB-2 has evolved to provide --
20 and the tools now provide doses to a variety of
21 organs --

22 **DR. BEHLING:** Yes.

23 **MS. BEHLING:** That's right.

24 **MR. HINNEFELD:** -- specific organs, and this --
25 this probably is -- the dose reconstructor would

1 relate me on -- you know, going back to previous
2 activities, I believe he's used the maximum non-
3 metabolic.

4 **MS. BEHLING:** Yes.

5 **DR. BEHLING:** And the only -- only issue here is
6 that when people -- and we've seen those through
7 the meetings that we've attended during the
8 public speaking sessions, and you realize that
9 oftentimes these people who are claimants
10 congregate and -- and compare notes. And I guess
11 it would be nice to know that when they do talk
12 to each other and they have common cancers, that
13 one doesn't say oh, they gave me this dose based
14 on a colon, but the other one says no, they used
15 a real -- and -- and it's just consistency and so
16 forth. So basically what we found here is that
17 almost -- most of the findings would reduce the
18 person's exposure.

19 **MR. HINNEFELD:** Yeah.

20 **DR. BEHLING:** And -- and we've made that
21 statement before. We're not afraid to say when
22 the doses are in excess of what they should be
23 based on available information, we're going to
24 cite that as a finding even though it may prove
25 to be not claimant-favorable.

1 **MR. HINNEFELD:** Yeah, I think there's something
2 to be said for that, for saying that hey, look,
3 if you've got a way -- if you have a way to do
4 the dose to the breast, it's not -- and it's the
5 same approach as the dose to the colon that they
6 gave more worth --

7 **MS. BEHLING:** Exactly.

8 **MR. HINNEFELD:** -- why bother to have these
9 artificial (unintelligible) thrown in. And I
10 think there's some -- that's certainly worth
11 carrying into our conversation with ORAU is that
12 they -- because of the consistency of the dose
13 reconstruction --

14 **DR. BEHLING:** Yeah.

15 **MR. HINNEFELD:** -- I think we'll get --

16 **DR. BEHLING:** I -- I think for --

17 **MR. HINNEFELD:** -- (unintelligible) dose
18 reconstruction, even if they're all
19 (unintelligible), it doesn't help us out.

20 **MS. BEHLING:** And I -- I believe the other
21 philosophy that we've taken is, as Hans was
22 saying, we don't always go with the maximal dose,
23 especially when it is a known. And that's also
24 consistent with the regulations, and it keeps the
25 dose reconstructions consistent among one another

1 if you follow that philosophy.

2 **MR. HINNEFELD:** Right.

3 **DR. BEHLING:** Okay. The next -- I guess final
4 two are on page 15. And the first one, 22.7-B.3,
5 is unresolved discrepancies between CATI report
6 and DOE records. The claimant indicated in the
7 interview that she was subject to in vitro
8 biological monitoring; that is, urinalysis. DOE
9 records, however, did not identify any bioassay
10 records. The claimant also stated that a medical
11 X-ray was taken in all but the last year of
12 employment. However, the DOE records provide no
13 evidence of any chest X-rays. And the claimant
14 stated that the worker had whole-body counts
15 annually through 1992, and DOE records only
16 provide in vivo data for four measurements. So
17 whether or not she's correct, it's always
18 difficult when you talk about a person's
19 testimony over the -- over the phone during an
20 interview. And at this point you're only left
21 with a discrepancy that you can't really assess
22 in terms of who's right or wrong. Are the
23 records complete and is the person who has
24 provided these statements during the interview
25 suffering from a lapse of memory, or is it the

1 fact that these records are in fact incomplete
2 and therefore are missing certain records is
3 something we can't really discuss or make a
4 judgment call other than to say it's a
5 discrepancy that is unresolved and that's why we
6 identify these deficiencies as having an
7 uncertain impact because we really don't know. I
8 mean the -- the -- obviously, one could cap, for
9 instance, a chest X-ray for breast cancer and say
10 well, we could assume an annual one and take the
11 dose to the breast as a function of time using
12 obviously TIB-6. That's not a problem. We could
13 account for that. But what is more difficult to
14 account for, if there are urinalysis data that
15 are simply not there, which the interviewee
16 claims to have been there, because that is
17 basically an open-ended question for which we
18 have no way of providing an answer.

19 **MR. HINNEFELD:** Yeah, and I don't know right now
20 what efforts, if any --

21 **DR. BEHLING:** Yeah.

22 **MR. HINNEFELD:** -- were taken to try to resolve
23 that.

24 **DR. BEHLING:** No, given the fact -- and I will
25 again -- come full circle again, is that this

1 person was given a very healthy hypothetical
2 internal exposure. And based on that large dose,
3 which is not only 12 but 28 radionuclides, one
4 could reasonably conclude that it's likely a
5 gross overestimate of whatever it is she might
6 have missed, and therefore one could come again
7 with the conclusion that the assigned dose is
8 more than likely to have bounded any internal
9 exposure. No question of that.

10 **MR. HINNEFELD:** Yeah. Well, certainly we would
11 feel that way, but I don't know what was done to
12 try to resolve any discrepancy. I will say that
13 not every site gives us X-ray information. And
14 so the fact that the DOE response didn't include
15 any evidence of medical X-rays would not
16 necessarily be surprising because a lot of sites
17 don't send -- it all -- it just depends on how
18 they keep -- do their record-keeping. So we
19 would -- I would -- I would expect that medical
20 X-ray was assigned for this person in the dose
21 reconstruction for each year of her employment
22 and so ...

23 **DR. BEHLING:** Yeah. And again, in conclusion,
24 when you look at Table 1 and the report at 5 and
25 you just scan through and you realize that

1 measured photon doses were 26 millirem and in the
2 end she was assigned to internal/external dose of
3 nearly 32, it clearly suggests that we bounded
4 her exposure.

5 **MR. HINNEFELD:** Right, right.

6 **MR. GRIFFON:** I guess the part where the CATI
7 interview goes back to comments we made in first
8 22, Stu, that -- you know, when you come out with
9 a DR report, I think -- I mean one concern that
10 we raised last time was this boilerplate type of
11 language that says the CATI was considered.

12 **MR. HINNEFELD:** Right.

13 **MR. GRIFFON:** And -- and it doesn't really speak
14 personally to that person, but you don't give the
15 details. For instance, she said in one of her
16 phone interviews that in '83/'84 I worked in some
17 really bad stuff. And, you know, that -- that
18 doesn't tell us much at all, but if you said
19 that, you know, we looked at these records, we
20 looked at these records and, you know, we
21 couldn't find any incidents in that time period.
22 However, we've assigned the 12 radionuclide, you
23 know --

24 **MR. HINNEFELD:** Right.

25 **MR. GRIFFON:** -- worst case dose as a claimant-

1 favorable measure, you know --

2 **MR. HINNEFELD:** Right.

3 **MR. GRIFFON:** -- that at least speaks to that
4 you're -- you're at least listening to them when
5 -- when they ask -- when you ask them what they
6 worked in, you know.

7 **MR. HINNEFELD:** Right. And of course all 60
8 cases have been selected before any feedback from
9 this review --

10 **MR. GRIFFON:** Right, right.

11 **MR. HINNEFELD:** -- has gotten back to our
12 (unintelligible) --

13 **MR. GRIFFON:** I understand. I understand.

14 **MR. HINNEFELD:** -- and so we'll see the same
15 kinds of things --

16 **MR. GRIFFON:** That's what I'm saying.

17 **MR. HINNEFELD:** -- from the entire --

18 **MR. GRIFFON:** It's the same comment.

19 **MR. ALLEN:** I was just going to say this one was
20 sent through December of '03.

21 **MR. HINNEFELD:** Right.

22 **MR. ALLEN:** So when this was sent to the
23 claimant, so there is a lag time.

24 **DR. ROESSLER:** Well, the book --

25 **MR. ALLEN:** I'm sorry. Go ahead, Gen.

1 **DR. ROESSLER:** It would be helpful on all of
2 these, I think, to have the date that the dose
3 reconstruction took place and then we could kind
4 of track what's happening with time.

5 **MR. HINNEFELD:** Okay. Well, we can provide that.
6 I mean we've got -- we can get them. But --

7 **DR. ROESSLER:** Just in a general way, I think.

8 **MR. HINNEFELD:** Yeah.

9 **MS. BEHLING:** There's a date on the dose
10 reconstruction report, completion date, so we
11 could incorporate that into our --

12 **MR. ALLEN:** Right. Well, we have --

13 **MS. BEHLING:** -- report, also.

14 **DR. ROESSLER:** Yeah, I think that would be
15 helpful.

16 **MR. ALLEN:** I don't know how much information
17 we'll put in the report for Privacy Act...

18 **DR. ROESSLER:** Well, I think maybe kind of a
19 general -- like the year, even, would help so we
20 could --

21 **MR. ALLEN:** The date it was -- the date the DR
22 was approved is probably okay. I wouldn't think
23 there'd be any particular --

24 **DR. ROESSLER:** Privacy.

25 **MR. ALLEN:** -- privacy issue with that. What do

1 you think?

2 **MR. HINNEFELD:** I don't think so. I just think
3 if you keep --

4 **MR. GRIFFON:** Yeah.

5 **MR. HINNEFELD:** -- taking everything that's okay
6 to put in --

7 **MR. GRIFFON:** Yeah.

8 **MR. HINNEFELD:** -- eventually you could supply
9 more--

10 **MR. ALLEN:** The more information that's okay by
11 itself --

12 **MR. GRIFFON:** Certain sites, certain cancer
13 approved --

14 **MR. ALLEN:** -- at some point --

15 **DR. ROESSLER:** Yeah, yeah.

16 **MR. HINNEFELD:** Yeah, at some point it's not okay
17 anymore.

18 **DR. ROESSLER:** Protective.

19 **DR. BEHLING:** Just as a final statement for this
20 case, on page 15 I make a statement here that
21 says SC&A concludes that the technically
22 inappropriate parameter selected for hypothetical
23 internal dose, which included 28 instead of the
24 12 radionuclides and the use of colon as a
25 surrogate for the breast, may have been motivated

1 by the potential for missed internal dosimetry
2 records. Meaning that maybe the guy said well,
3 in the absence of -- of dosimetry records on all
4 the internal --

5 **MR. HINNEFELD:** Right.

6 **DR. BEHLING:** -- I will opt to go and aim high on
7 two counts. One, the use of 28 radionuclides and
8 the use of colon instead of the breast, both of
9 which are obviously very claimant-favorable with
10 -- with -- and provide a dose beyond what's --
11 the procedures would have dictated.

12 **MR. HINNEFELD:** Right.

13 **MS. BEHLING:** Okay. I guess we'll move on to tab
14 23, which is case number 004747. And this
15 employee worked at both the Y-12 plant and the
16 Oak Ridge gaseous diffusion, the Y-25 plant. And
17 he worked between 1954 and 1992 in three
18 uninterrupted employment periods. In 1997 the
19 worker was diagnosed with prostate cancer. And
20 he was a machinist and worked at various
21 buildings and plants throughout the facility.
22 His -- NIOSH calculated a dose of 24.7 rem and
23 that resulted in a POC of 24 percent. And as you
24 can see from Table 1, the majority of the dose
25 was the hypothetical internal dose that this

1 person was assigned. But starting with the first
2 finding, 23.1-C.1.1 on page 9, in this particular
3 case we found a discrepancy between the two
4 different guidance documents -- and when we're
5 talking an incorrect assignment or what we
6 consider an incorrect assignment of a surrogate
7 organ, this was a prostate cancer and the dose
8 reconstructor selected the testes as the
9 surrogate organ. If you look at TIB-0005, they
10 recommend using the bladder as the surrogate
11 organ for the prostate, and OCAS -- the
12 implementation guide, OCAS-IG-001, actually
13 recommends the testes. So I guess the dose
14 reconstructor wasn't wrong in using the testes
15 here because one guidance document does recommend
16 that. But I think obviously there's -- has to be
17 a correction to --

18 **MR. ALLEN:** Okay. At the time this was done,
19 they both recommended that and it was changed in
20 one and, you know, we hadn't got it changed in
21 the other yet.

22 **MS. BEHLING:** They both recommended testes? Is
23 that --

24 **MR. HINNEFELD:** Early on -- early on the testes
25 was --

1 **DR. BEHLING:** Clearly, the bladder is the more
2 correct one.

3 **MR. HINNEFELD:** Yeah. And you're right, the end
4 value should be modified to reflect that.

5 **MS. BEHLING:** Okay. The second finding -- now
6 this particular case, the dose reconstructor
7 entered the recorded dose as a constant with no
8 uncertainty. And this is another one of these
9 procedural issues that Hans and I have been
10 challenged by, and that's the implementation
11 guide which recommends when you have a recorded
12 dose, you enter it as a normal distribution with
13 a -- you have a numerical standard deviation and
14 the guidance provided in that implementation
15 guide is -- is very, very complex and difficult.
16 And we have never seen -- at least in these 38
17 cases we haven't seen one dose reconstructor even
18 attempt it.

19 **MR. HINNEFELD:** Right. That's where he used an
20 uncertainty area reading -- right? Isn't that
21 what it describes to do and -- and --

22 **MS. BEHLING:** Yes.

23 **MR. HINNEFELD:** -- propagate the uncertainty for
24 everyone...

25 **MS. BEHLING:** Yes.

1 **MR. ALLEN:** And for TLD to contact your local DOE

2 --

3 **MR. HINNEFELD:** (Unintelligible)

4 **MS. BEHLING:** (Unintelligible)

5 **DR. BEHLING:** And I look at that and say, come on
6 now. Let's use something more realistic. Use a
7 30 percent --

8 **MR. HINNEFELD:** We were a lot more naive in those
9 days, and I think that was probably written
10 before Dave -- even Dave maybe wasn't on the
11 program yet when that was done. I certainly
12 wasn't. Yeah, the point being though, you'd have
13 a == you know, there is the issue that still --
14 it's still kind of outstanding; they haven't
15 resolved it yet from the first set of 20 -- about
16 in the situation where you have a measured dose
17 and -- which is supposed to be normally
18 distributed. And we have some sort of guidance
19 usually that in a particular Technical Basis
20 Document what's a good standard deviation to
21 choose as a shortcut, and I think it's 30 percent
22 for most years.

23 **MS. BEHLING:** That makes sense.

24 **MR. HINNEFELD:** And maybe 50 percent on very
25 early years or something.

1 **MR. ALLEN:** Yeah, I think it's in one of these
2 cases. I don't remember the number.

3 **MR. HINNEFELD:** Yeah.

4 **DR. BEHLING:** I mean the medical usually uses 30
5 percent --

6 **MR. HINNEFELD:** Yeah. There is some standard --

7 **DR. BEHLING:** -- as a default value.

8 **MR. HINNEFELD:** We do have to have some standard
9 guidance out there on how to use it, and then the
10 dose reconstruction technique we're talking about
11 is that the don't use the uncertainty. They
12 enter the measured value as a constant and then
13 they don't apply the dose conversion factor --
14 the organ-specific dose conversion factor, but
15 they'll apply a 1, a 1 as a conversion factor,
16 which is higher than the entire range --

17 **DR. BEHLING:** Offsets.

18 **MR. HINNEFELD:** -- of dose conversion factors by
19 organ saying that this is an overestimating
20 approach and so we're going to leave it as a
21 constant, and is that in fact the right thing to
22 do. Is that in fact -- (unintelligible) we
23 haven't resolved it. I don't know of any way to
24 do it other than to do a whole bunch of Monte
25 Carlo combinations and just see, you know, case

1 by case for all these -- for all these organ DCFs
2 that wouldn't be utilized in this fashion where
3 the range is below 1 or below .8 or something
4 like that -- is that does it in fact work out
5 that way, and we haven't finished that yet. And
6 it's still kind of the same hanging-over issue
7 from the first 20. So that issue -- you're right
8 on that.

9 **DR. BEHLING:** I mean it should be --

10 **MR. HINNEFELD:** We're not arguing with that.

11 **DR. BEHLING:** -- deleted because it's too
12 complex. It's too time-consuming --

13 **MR. HINNEFELD:** All that -- all that discussion,
14 yes.

15 **DR. BEHLING:** -- and it doesn't -- certainly it
16 doesn't warrant that kind of investment of time
17 for developing a sigma value. I think it's
18 reasonable to conclude that a surrogate approach
19 is too high at 30 percent sigma value and say
20 that's it, that's good enough.

21 **MR. HINNEFELD:** Right.

22 **DR. BEHLING:** It's claimant-favorable.

23 **MR. HINNEFELD:** Right.

24 **MR. GRIFFON:** Well, but it has to be -- I mean
25 you said delete it. It has to be replaced --

1 **DR. BEHLING:** Yeah.

2 **MR. GRIFFON:** -- with something. Yeah.

3 **DR. BEHLING:** Yeah.

4 **MS. BEHLING:** Yeah. This is where I think we can
5 hopefully give you some guidance as to the
6 procedures that are giving the -- the dose
7 reconstructors the most problem, because we --
8 after going through these first 38 cases, we can
9 certainly list for you these are the procedures
10 that the dose reconstructors seem to -- to be
11 most difficult for them is just that the guidance
12 isn't clear and that they do it wrong.

13 **MR. HINNEFELD:** Okay. Yeah, okay.

14 **MS. BEHLING:** Okay. Now if we move on to the
15 neutron dose, in this particular case, the --
16 there was no neutron dose calculated. However,
17 when we looked at the DOE records, it -- it
18 showed zeroes for neutron readings or -- or --
19 yeah, it was 52 zero neutron readings and this --
20 these occurred between 1961 and 1974. And based
21 on the fact that this person was a machinist and
22 worked in various areas of the plant, we thought
23 that there was some potential for neutron
24 exposure.

25 **DR. BEHLING:** And -- and I guess you can clarify

1 this issue, because obviously post-'70, the HMPD
2 dosimeter was used that was capable of measuring
3 obviously shallow dose, deep dose, photon dose,
4 as well as neutron dose. And it may very well
5 have been a badge that was assigned to people
6 with or without any potential for neutrons,
7 meaning that it was processed regardless, and the
8 zero dose didn't mean he was exposed to neutrons
9 except that that was a dosimeter that was
10 assigned to everyone independent of whether or
11 not there was a potential. And so we have to
12 know what the difference is.

13 **MR. HINNEFELD:** Well, that certainly happened a
14 lot of places, where they'd hang a badge on
15 someone regardless of their -- and then the badge
16 could measure neutrons regardless of the person's
17 potentials 'cause everybody wore that badge.

18 **DR. BEHLING:** Yes.

19 **MR. HINNEFELD:** Now I -- I'll have to do some
20 more research this week to sort this particular
21 case out on why the dose -- in the dose
22 reconstructor's judgment he decided that this
23 person wasn't reasonably exposed to neutrons so
24 we don't have to do the neutron missed dose.
25 There's also another limiting -- you know, could

1 be another limiting factor rather than doing just
2 your -- your -- if neutrons are assigned, one
3 approach would be to use the neutron -- the
4 standard missed dose calculation for neutrons,
5 and the other would be -- that may be too high
6 based on his external photon exposure and the
7 neutron to photon ratios. So there may be
8 another bounding step that would be done in
9 assigning it because the neutron to photon ratio
10 would indicate that the -- the -- if he doesn't
11 have any measured photon dose, his neutron dose
12 can't be as high as the standard missed dose
13 calculation would tell you. So there might be
14 another bounding step in there, but I'll just
15 have to go look at the case and see what the
16 judgment was for determining that this person was
17 really not exposed to neutrons and therefore it's
18 okay to (unintelligible).

19 **DR. BEHLING:** And it can be quite substantial if
20 a person --

21 **MR. HINNEFELD:** Oh, yeah. It's going to be big.

22 **DR. BEHLING:** -- worked in the area and he was
23 monitored 12 cycles a year, missed neutron dose
24 can be very substantial, which if he wasn't
25 exposed, shouldn't be there. But if he was, it

1 should be there.

2 **MR. HINNEFELD:** Right.

3 **MS. BEHLING:** In fact I think we calculated about
4 7 to 8 rem in this particular case. And I guess
5 another question that comes up, and I may have
6 misstated this, because in the records it's
7 sometimes confusing, and this is something that
8 we talked about, when there's a blank as opposed
9 to a zero --

10 **MR. ALLEN:** Yeah.

11 **MS. BEHLING:** -- and how do we treat that. And I
12 guess it's probably site-specific --

13 **MR. ALLEN:** And error.

14 **MS. BEHLING:** -- and error-specific.

15 **MR. ALLEN:** Error specific.

16 **MS. BEHLING:** Error specific, yes.

17 **MR. ALLEN:** It varies with time from each site
18 and --

19 **MS. BEHLING:** Yeah.

20 **DR. BEHLING:** Especially for -- for Savannah
21 River between '70 and 1988, there was that blank
22 spot that involved the recording of doses, that
23 if they were below a certain value they didn't
24 even bother reporting them.

25 **MS. BEHLING:** Yeah, so --

1 **MR. GRIFFON:** I know this one jumped out at me
2 because I -- I thought I remembered hearing some
3 issues with this at Y-12 specifically, so --

4 **MR. HINNEFELD:** You've gone through Y-12, or...

5 **MR. GRIFFON:** Not necessarily on neutrons, just
6 the -- the practice of whether they were entering
7 blanks as opposed to zero values or -- or --

8 **MS. BEHLING:** For the dosimeter records.

9 **MR. GRIFFON:** Yeah, trying to -- I think it was
10 for deep -- you know, photon dose. But I don't -
11 - I don't recall, you know.

12 **MR. HINNEFELD:** But they were recording zeroes
13 when the reading didn't really indicate a zero?
14 Is that what you're saying?

15 **MR. GRIFFON:** Yeah, whether they were recording
16 blanks --

17 **MS. BEHLING:** Blanks.

18 **MR. GRIFFON:** -- when they were measuring less
19 than detectable.

20 **MR. HINNEFELD:** Oh, so it looks like there was no
21 read --

22 **MR. GRIFFON:** Right.

23 **MR. HINNEFELD:** -- but in fact it was a zero
24 read.

25 **MR. GRIFFON:** When it was -- yeah, when it was

1 less --

2 **MR. HINNEFELD:** Or a less than detectable
3 reading.

4 **MR. GRIFFON:** -- than detectable, right.

5 **MR. HINNEFELD:** Oh, okay.

6 **MR. ALLEN:** Well, the Y-12 report that I'm
7 thinking of only sees -- there's always a zero
8 there, the ones I'm thinking of.

9 **MR. HINNEFELD:** The ones I'm thinking of too, but
10 I can't really -- I've seen too many sites, too
11 many (unintelligible).

12 **MR. ALLEN:** Yeah, that's my problem too.

13 **MS. BEHLING:** Okay. The finding 4 on page 12,
14 again, this is what we discussed before. The Y-
15 12 and K-25 plant do not have a reactor,
16 therefore we felt they should have selected the
17 hypothetical dose model with the 12 radionuclides
18 as opposed to the 28. I think we've come to
19 agreement on that. In this -- well, when we go
20 on to now the CATI report and to our finding
21 number 5. In -- in this particular case, we did
22 identify the fact that there -- there was --
23 there was an inconsistency between at least what
24 the employee indicated in the CATI regarding two
25 incidents that he was involved in. One he

1 describes as a critical spill of mop water, and
2 also a fire, a uranium fire. And it just
3 stresses that in some of these cases we don't
4 always see a lot of follow-up with information
5 that's provided in the CATI report. And it just
6 -- when there's situations like this, we just
7 think it would be best if they did go back and --
8 and try to contact DOE and see if there's, you
9 know, more extensive records than -- than what
10 you received the first time.

11 **MR. HINNEFELD:** Okay. We -- we think we have a
12 pretty complete record of the Y -- if we're
13 talking about the 1958 Y-12 criticality, which
14 was -- there was a criticality at Y-12.

15 **MS. BEHLING:** Yes. Oh, yes.

16 **MR. HINNEFELD:** And we think we have pretty
17 complete records of the involved person on that.

18 **MS. BEHLING:** Yeah.

19 **MR. GRIFFON:** It's pretty well-described, et
20 cetera.

21 **MS. BEHLING:** Yes.

22 **MR. HINNEFELD:** And so that turned out it's the
23 only criticality for Y-12. So he may have worked
24 -- I mean he may have been at Y-12 learning that,
25 but we think we know pretty much who was, you

1 know, affected by or in that building. So --

2 **DR. BEHLING:** In and around.

3 **MR. HINNEFELD:** Yeah, in and around that
4 building.

5 **MS. BEHLING:** Yeah.

6 **MR. HINNEFELD:** So I would think that the
7 criticality of -- of -- what did you say, mop
8 water or something, was actually -- they were in
9 fact -- I think it's the cleaning.

10 **MR. ALLEN:** Critical spill of --

11 **MR. HINNEFELD:** Critical spill of mop water.

12 **MS. BEHLING:** Yeah.

13 **MR. HINNEFELD:** They were in fact I think doing
14 some cleaning of tanks.

15 **MS. BEHLING:** I understand. And we also
16 recognize that you did assign the hypothetical
17 internal dose and used 28 radionuclides and it's
18 a very conservative assumption. I guess, as we
19 had mentioned earlier, when you come to these
20 meetings and, you know, you -- you hear the
21 claimants speak, it's just it would sometimes I
22 think help them if they were convinced that we
23 really did --

24 **MR. GRIFFON:** No, but that -- that particular one

25 --

1 **MS. BEHLING:** -- look through these records.

2 **MR. GRIFFON:** -- the claimant -- I didn't read
3 that one, but was he claiming some sort of
4 criticality of --

5 **MR. HINNEFELD:** Well, I think he claimed he was
6 exposed a couple times early on --

7 **MR. GRIFFON:** Oh, okay.

8 **MR. HINNEFELD:** -- through a couple of events.
9 He -- you said he mentioned a uranium fire?

10 **MS. BEHLING:** Yes. He mentions that's where the
11 uranium fire (unintelligible), so...

12 **MR. GRIFFON:** Oh, okay.

13 **MR. ALLEN:** And that mop water, I think it was
14 pretty much the description right there, wasn't
15 it? A critical spill of mop water --

16 **MS. BEHLING:** It is.

17 **MR. ALLEN:** -- involved with this.

18 **MR. HINNEFELD:** Yeah.

19 **MR. ALLEN:** It was -- I don't even think he said
20 1958, but it was in that era. Or he might have
21 said --

22 **MR. HINNEFELD:** He worked there during that
23 period. I don't think he -- I don't know if he
24 ever gave a date for that.

25 **MS. BEHLING:** I believe he said 1958.

1 **MR. ALLEN:** Definitely need to look at that and
2 the documentation in the dose reconstruction as
3 far as what they looked at is lacking.

4 **MR. HINNEFELD:** Yeah, well, we'll look at it.

5 **MS. BEHLING:** Yeah. Okay.

6 **MR. MAKHIJANI:** Could I ask a question? How did
7 you -- how did you handle the fire, the uranium
8 fire?

9 **MR. HINNEFELD:** The uranium fire? Well, I mean
10 the uranium fire would probably -- he said
11 multiple uranium fires.

12 **MR. MAKHIJANI:** Yeah.

13 **MR. HINNEFELD:** Which is probably, you know,
14 burning chips or --

15 **MR. MAKHIJANI:** Yeah, the chips.

16 **MR. HINNEFELD:** -- (unintelligible) and things
17 like that. The dose reconstruction included the
18 hypothetical maximizing intent, which we believe
19 would bound exposure from that situation. And I
20 don't know if -- do we have any internal
21 monitoring information on this guy? I don't
22 remember if we have an internal monitoring record
23 or not.

24 **MS. BEHLING:** I don't know.

25 **MR. HINNEFELD:** I don't remember if this person

1 had any. I mean our view would be, you know, in
2 a situation like that, that 12 -- that
3 hypothetical intake -- intake bounds the kind of
4 intakes you would see at -- even at a relatively
5 chronic episodic set of events like that.

6 **MR. MAKHIJANI:** Can I ask if --

7 **MR. ALLEN:** He did have -- he did have urinalysis
8 and the hypothetical intake is higher.

9 **MR. HINNEFELD:** It's higher?

10 **MR. ALLEN:** It's higher.

11 **MR. HINNEFELD:** Then okay, that is your number.
12 Okay?

13 **MR. GRIFFON:** Can I ask a silly question, maybe a
14 silly question? In the -- in your report, SC&A's
15 report, it says that claimant received radiation
16 exposure during employment as a machinist, as a
17 machinist that came to perform work at the K-25
18 plant in Buildings Alpha 1-5; Beta 2-4, and 9212,
19 9215, and he also worked as a machinist at Y-12.
20 Is that from the DR report? Because if that's
21 from the DR report, you're going to lose
22 credibility right away because those are -- those
23 buildings are all Y-12 buildings that you
24 mentioned under K-25. The claimant's going to
25 say, they don't even know where I work, you know.

1 **MS. BEHLING:** Yeah.

2 **MR. GRIFFON:** Now, it might -- it might be that -
3 - I don't know. I haven't got it wrong here, I
4 just want to --

5 **DR. BEHLING:** I have to look to see if that comes
6 out of the CATI report.

7 **MR. GRIFFON:** I didn't see it on the -- I don't
8 have the DR report on mine.

9 **MR. HINNEFELD:** I've got it right here.

10 **MR. GRIFFON:** It's just worth double-checking.
11 If you mentioned the wrong buildings, I think you
12 lose credibility with these people.

13 **MS. BEHLING:** Up front.

14 **DR. ROESSLER:** So all those buildings --

15 **MR. GRIFFON:** All those -- that list of buildings
16 are all Y-12.

17 **DR. ROESSLER:** -- all in Y-12?

18 **MR. GRIFFON:** Except I don't know about H-2. I
19 never heard of that one.

20 **DR. ROESSLER:** That might have been just a
21 shorthand way of writing that.

22 **MR. ALLEN:** Says he worked as a machinist before,
23 Building 1401 at K-25. And all the others say Y-
24 12.

25 **MR. GRIFFON:** Y-12, okay.

1 **MR. ALLEN:** In the DR report.

2 **MR. GRIFFON:** All right. So you just got a
3 little --

4 **MS. BEHLING:** Yeah.

5 **MR. GRIFFON:** -- or -- or --

6 **MS. BEHLING:** Okay. We're going to make that
7 change.

8 **MR. GRIFFON:** As long as it's correct on the DR
9 report. I just wanted to double-check.

10 **MS. BEHLING:** Okay.

11 **UNIDENTIFIED:** (Unintelligible)

12 **MS. BEHLING:** Yeah, uh-huh. Okay. I think we're
13 done with -- unless there's other questions on
14 tab 23. Okay. We'll move on into tab 24, and in
15 this particular case, this is case number 012943.
16 And this individual worked at the Y-12, K-25 and
17 the X-10 sites at Oak Ridge.

18 **MR. GRIFFON:** Can --

19 **MS. BEHLING:** I'm sorry.

20 **MR. GRIFFON:** I'm sorry. I'm just a little
21 behind, a little slow this morning, tired. Was
22 4747, the last case we did, the person worked
23 there from '54 on; is that correct? From '54 to
24 whatever? I have a note on my -- my hand-
25 scratched notes here about --

1 **MS. BEHLING:** '54 to --

2 **MR. ALLEN:** '90.

3 **MR. GRIFFON:** Okay. The unmonitored dose prior
4 to 1961, you might have already -- I think you
5 passed by it, Kathy. I'm sorry.

6 **MS. BEHLING:** That's all right.

7 **MR. GRIFFON:** But my question is, is that
8 something -- I mean I know there's -- there's
9 Technical Information Bulletins that have come
10 out on Y-12 and how to handle that. It was and -
11 - it wasn't available at the time --

12 **DR. BEHLING:** At the time of this
13 (unintelligible)?

14 **MR. GRIFFON:** Right.

15 **DR. BEHLING:** Yeah, there was no -- no procedure,
16 and he did something that I considered reasonable
17 and claimant-favorable by taking the maximum year
18 in 1962 and multiplying that yet by 2 --

19 **MR. GRIFFON:** Right.

20 **DR. BEHLING:** -- and assigning it to all years
21 prior to '61. And based on the more current
22 guidance, he got a much larger dose than he would
23 have gotten under the current guidance.

24 **MR. GRIFFON:** Right, right. Well, I guess my --
25 my question here is just -- just how to -- how to

1 handle this finding more -- more than -- because
2 I don't necessarily -- I mean Hans, you explained
3 this to me on our conference call that -- and I
4 don't necessarily disagree with you, that he had
5 -- sorry. I'm covering up the mike. You know,
6 he had the -- a similar job all throughout that
7 period and -- and they doubled his highest -- his
8 highest annual dose I guess and applied it to the
9 time periods. However, now there's a -- a new
10 Technical Information Bulletin coming out on how
11 to deal with that. I wonder if -- if resolution
12 on -- on that kind of finding shouldn't be
13 reserved for the Y-12 site profile review, as
14 we've done in the past, because I wonder if it's
15 a broader description of how -- how should that
16 be handled. Is it appropriate just to assign,
17 you know, a factor -- just multiply it by 2 and -
18 - and assign a dose for those earlier periods?
19 Maybe in this particular instance where he's got
20 the same job and the same, you know, situation,
21 it might be appropriate. But I just think
22 there's a broader discussion there that -- that
23 back extrapolation from time periods when you had
24 data to time periods where you didn't have any --
25 any monitoring records. There's a broader

1 discussion. I'm not disagreeing with what Hans
2 said about this case, but --

3 **MR. HINNEFELD:** I think certainly the -- that
4 discussion certainly should be I think a
5 Technical Basis Document type of discussion
6 because it will -- it will certainly happen at Y-
7 12.

8 **MR. GRIFFON:** Right.

9 **MR. HINNEFELD:** I don't know of a similar type of
10 period at Savannah River, but -- so it wouldn't
11 necessarily come up there, but that kind of --
12 the discussion of what's appropriate in those
13 situations will certainly come out during the Y-
14 12 TBD review, so maybe we can defer it to that.

15 **MR. GRIFFON:** I just wonder if for this
16 particular situation, you know, if -- if -- I'm
17 not sure what the activities were that were going
18 on prior to '61, but I imagine they were pretty
19 similar if not less than what he was doing in
20 '61.

21 **MR. HINNEFELD:** I -- I would -- I would think --

22 **MR. GRIFFON:** In the same job, I think
23 multiplying by 2 is probably pretty darn
24 conservative, like you said. But it also -- to
25 some people, I think they could say well, that's

1 -- boy, they had no data and they just threw in a
2 factor of two swag and -- and assigned this.
3 What's your basis, you know.

4 **DR. BEHLING:** Well, I think the assumption --
5 again, if I look at the new procedure, it says
6 the procedure is only applicable under conditions
7 where the individual didn't switch job and he has
8 at least five cycles post-'62 on which you -- you
9 extrapolate the data. And so it doesn't answer
10 all the questions, but for instance let's assume
11 a person worked between '54 and stopped in '61.
12 Well, you have no data now. You're not going
13 beyond the '61 time frame where you can say well,
14 you know -- and he -- assuming he didn't switch
15 jobs, then extrapolating backwards using the
16 protocol, that -- that's not available to you,
17 and I don't know how you will deal with Y-12.
18 The only issue is that apparently the assignment
19 of badges was based on certain potential for
20 exposures, meaning that if you were not badged
21 prior to '61, you were considered a low-exposure
22 worker as opposed to those who were badged who
23 had -- and I don't remember what the criteria was
24 --

25 **MR. HINNEFELD:** That seems to be the case at Y-

1 12.

2 **DR. BEHLING:** Yes.

3 **MR. HINNEFELD:** Y-12 did in fact, before '61,
4 badge the people they felt had the highest --

5 **DR. BEHLING:** High potential.

6 **MR. HINNEFELD:** So there -- I mean there will be
7 -- there may be a variety of approaches that,
8 when they come up, can deal with those kinds of
9 periods, those data gap kinds of periods. But
10 again, I think that the discussion of what are
11 appropriate approaches for those kinds of things
12 is maybe a TBD type of discussion --

13 **MR. GRIFFON:** Right.

14 **MR. HINNEFELD:** -- or topic, more so than
15 individual case kind of topic. Certainly it will
16 influence -- you know, it would influence a good
17 deal of the work that we will do and, to a
18 certain extent, what we have done. It all comes
19 up on those same -- so -- or whatever -- whatever
20 the whole determination of it.

21 **MR. GRIFFON:** I guess -- I guess my feeling on
22 this is -- is, you know, my -- my gut tells me
23 this -- this method that they used, that they
24 applied, was probably claimant favorable, but
25 what is the basis for it? You know, it seems

1 like it was kind of pulled out of the -- you
2 know.

3 **MR. HINNEFELD:** I guess there is a sort of --

4 **MR. GRIFFON:** Throw in a factor of 2 --

5 **MR. HINNEFELD:** -- kind of a judgment of --

6 **MR. GRIFFON:** Or individual judgment, yeah.

7 **MR. HINNEFELD:** -- if he's exposed to these
8 levels from here on, he probably wasn't exposed
9 to more than double that --

10 **MR. GRIFFON:** Right.

11 **MR. HINNEFELD:** -- each year back farther, so I
12 mean it's probably just a --

13 **MR. ALLEN:** As far as I know --

14 **MR. HINNEFELD:** -- considered equal judgment.

15 **MR. ALLEN:** As far as I know that technique was
16 always used -- only used case by case.

17 **MR. GRIFFON:** Yeah.

18 **MR. ALLEN:** I mean that particular one, it wasn't
19 used that much. Like in this particular case,
20 they looked at it and said, you know, does this
21 kind of technique work for this individual, and
22 then used it.

23 **MR. GRIFFON:** I think it might have even been --
24 you know, that's what I'm saying is that it may
25 necessarily not -- doesn't likely affect this

1 individual case, but I think there is a broader
2 discussion that has to take place, and I don't
3 want to lose that as an item. I think we're
4 covering Y-12 site profile anyway --

5 **MR. HINNEFELD:** Yeah, I think there are
6 interviews going on down there this week.

7 **MR. GRIFFON:** Right, right, right. So...

8 **MR. MAKHIJANI:** I -- I agree with Mark in the
9 sense that, you know, I -- I haven't looked as
10 many records as Mark, but one of the difficulties
11 in extrapolating -- say you start in '62 and your
12 records for five years beyond that point back is
13 in a lot of places the conditions in the '50s
14 were worse than in the '60s. Because I mean from
15 the '50s, '60s, and '70s, overall there seemed to
16 be an improvement. So -- and I think how much of
17 an improvement is probably site-specific and
18 work-specific. So I think this factor of two in
19 fact may be claimant-favorable in some
20 circumstances and may not be -- and so I would
21 wonder whether something like area monitoring
22 information --

23 **MR. HINNEFELD:** Well, at Y-12 and K--

24 **MR. MAKHIJANI:** -- area badges and things like
25 that might not be a suitable base to establish

1 this factor rather than a factor of two.

2 **MR. HINNEFELD:** Well, the basis for the
3 extrapolation of Y-12, which is -- was not
4 available at the time this dose reconstruction
5 was done but which is available now -- is the
6 work -- workers who were monitored from the early
7 '50s on through into the -- well into the '60s
8 had -- the monitored cohort, in other words. And
9 what happened to their doses as you go earlier
10 from '61 out of what -- at what rate do those
11 doses go higher. And so that back extrapolation
12 was based on the monitored cohort and then that -
13 - people who joined the monitored cohort in '61
14 and had a consistent job back earlier, that their
15 -- you know, there's this analog of theirs would
16 extrapolate backwards at approximately the same
17 rate as the monitored population that was
18 monitored for the entire period. So that's the
19 basis for (unintelligible) --

20 **MR. GRIFFON:** So you have some priors. You have
21 --

22 **MR. HINNEFELD:** Yeah.

23 **MR. GRIFFON:** Yeah.

24 **MR. HINNEFELD:** There was a -- there was a set of
25 monitored -- there was a monitored cohort

1 identified, 100 and some-odd people who were
2 monitored early -- from early in the '50s in --
3 well into the '60s and so they spanned that '61
4 date. And that -- the -- their -- the behavior
5 of their dose, as it declined over time, was the
6 basis for the back extrapolation of the people
7 who started monitoring in '61.

8 **MR. GRIFFON:** In the same area?

9 **MR. HINNEFELD:** I mean I don't know where these
10 people (unintelligible).

11 **MR. GRIFFON:** Okay.

12 **MR. HINNEFELD:** In Y-12. I know they're Y-12.

13 **DR. BEHLING:** I don't think they segregate on the
14 basis of job description. There was 50 monitored
15 workers, which assumably involved the most
16 exposed population of workers.

17 **MR. HINNEFELD:** Like I said, that seems to be the
18 case that Y-12 attempted in the '50s to monitor
19 the people that they thought would be more highly
20 -- that seems to be what they were doing.

21 **MR. GRIFFON:** Yeah, I just -- I think we'll leave
22 it at that. I think it needs the discussion in
23 the TBD. This likely would not affect this case,
24 I tend to agree. But further the discussion in
25 the TBD -- I mean the other thing to remember at

1 Y-12 was that all these people were at X-10
2 hanging out and there was about one to cover the
3 whole Y-12 facility for most of those early
4 years.

5 **MR. HINNEFELD:** It's just a uranium plant.

6 **MR. GRIFFON:** Yeah, I know, I know. They had a
7 plant with the californium and einsteinium at X-
8 10 there --

9 **MR. HINNEFELD:** All the fun stuff at X-10.

10 **MR. GRIFFON:** Yeah, that's right.

11 **MS. BEHLING:** Okay. Can we move on now since
12 (unintelligible)?

13 **MR. HINNEFELD:** Yeah.

14 **MS. BEHLING:** Okay. I'll go back to tab 24. As
15 I said, that's case number 012943. The
16 individual worked in Y-12, K-25 and the X-10
17 facility for a 21-year period and was diagnosed
18 with prostate cancer in 2000. The dose
19 calculated by NIOSH was 41.6 rem and the POC was
20 31.45 percent. This -- we only have two findings
21 on this particular case, and the first one I
22 believe we've covered on previous cases,
23 reoccurring problem with -- for the photon, you
24 know, misinterpretation of the -- of the TIB-8
25 and TIB-10 procedures and the improper assignment

1 of the uncertainty, so (unintelligible). And the
2 second finding in this --

3 **MR. GRIFFON:** Well, you know, this uncertainty in
4 this one -- I think you said the POC was 41
5 percent (unintelligible) -- 41 percent, and you
6 add in uncertainty on 8 rem or whatever you've
7 got here.

8 **MS. BEHLING:** Okay, 31 percent is the POC on this
9 one.

10 **MR. GRIFFON:** Oh, 31 percent? Okay, so it still
11 may not...

12 **DR. BEHLING:** And the -- actually, the
13 uncertainty that was added to it shouldn't have
14 been added. Therefore, the POC will come down.

15 **MS. BEHLING:** Come down.

16 **MR. GRIFFON:** Okay.

17 **MS. BEHLING:** And the second and last finding in
18 this case, here again it -- this speaks to using
19 his professional judgment in the dose
20 reconstruction reports. And something came to
21 mind when we were talking about Mark's issue with
22 the Y-12, it seems to me that when the dose
23 reconstructor does use professional judgment to
24 make certain assumptions or decisions, it would
25 be nice if -- I assume he has to have some basis

1 for making that professional judgment. Once
2 again, the dose reconstruction report would
3 benefit from a little bit more explanation, as
4 we've belabored on the first Y-12 case. In this
5 particular case, the -- the dose reconstructor
6 assigned an on-site ambient dose of 1 rem per
7 year. And we went into each of the three
8 Technical Basis Documents for the Y-12, K-25 and
9 X-10 facilities. And for example, at the Y-12
10 facility we calculated a median and a 95th
11 percentile value for an annual dose of 55
12 millirem with a 95th percentile of 335 millirem
13 at that particular facility. So it just seems a
14 bit excessive and inordinately conservative to
15 use the 1 rem per year and it was -- I just could
16 not understand what his basis was or -- or -- I
17 think he stated in their professional judgment.

18 **MR. ALLEN:** Yeah, I think that's, again, early on
19 when you -- all you had was a cursory review of
20 data and you bound it based on the cursory
21 review, and you wouldn't bound it very high.
22 That's essentially all that (unintelligible).

23 **DR. ROESSLER:** On this one you just got done --

24 **MS. BEHLING:** Yes.

25 **DR. ROESSLER:** In the table there, there's a bold

1 under the occupational medical dose. In Table 1,
2 is that -- is there any significance to that, on
3 page 4? It doesn't appear to be as you read
4 back.

5 **UNIDENTIFIED:** What's the number?

6 **DR. ROESSLER:** The number? Seven millirem,
7 probably just a --

8 **MS. BEHLING:** No significance other than -- to be
9 pointed out?

10 **DR. ROESSLER:** Okay. I was looking for something
11 and didn't find it yet.

12 **DR. BEHLING:** (Unintelligible) --

13 **MS. BEHLING:** Yeah.

14 **DR. BEHLING:** -- on the issue of... Sometimes we
15 deal with trivia and I noticed that in the TIB-6
16 that involves the generic occupational medical
17 exposures, we have certain (unintelligible) that
18 are outside the primary field, especially in
19 latter years when there was collimation and then
20 everything else. We have doses that -- for
21 certain tissues, each of them minus six or even
22 seven rem --

23 **MS. BEHLING:** Yeah, yeah.

24 **DR. BEHLING:** -- and you get to the point of
25 saying why are you saying that (unintelligible)

1 millirem because -- and my criticism is in -- in
2 so many instances we try to impart a feeling we
3 have, this level of precision that doesn't exist.
4 And as I said, it's like saying well, your
5 exposure was approximately (unintelligible) whole
6 body, but you're -- based on the
7 (unintelligible), we have to divide it by three
8 and then you end up dividing about 10 by three
9 and come up with 3.3333 to ad infinitum and you
10 realize that -- that doesn't make it. The -- the
11 limiting factor is the about 10 rem so if you
12 divide by three, don't go beyond the first
13 decimal point because it's a (unintelligible)
14 precision that has no meaning.

15 **DR. ROESSLER:** So if anything, this number should
16 have been (unintelligible).

17 **MS. BEHLING:** I think what maybe we're talking
18 about is that this issue of balancing precision
19 against (unintelligible) as stated in the
20 regulations. I'm surprised we get carried away
21 here trying to calculate seven millirem.

22 **UNIDENTIFIED:** (Unintelligible)

23 **DR. ROESSLER:** I'm going to have to leave for a
24 few minutes.

25 **MS. BEHLING:** Okay. I believe that's it for this

1 case unless there's any other questions.

2 **MR. HINNEFELD:** We'll take a break.

3 (Whereupon, a recess was taken.)

4 **DR. BEHLING:** We're at tab 25, which is the claim
5 number 4567. The individual worked at Oak Ridge
6 K-25 site and if we could go over with the
7 background of this individual, this guy worked
8 from October 22nd, 1953 to January 4th, 1954 and
9 that represents a total of 11 weeks of -- of
10 employment. The individual was diagnosed in the
11 year 2001, which is now really about 47 years
12 later, with a skin cancer. In behalf of this
13 individual, a skin dose of 28.78 rem was
14 calculated, which results in a POC value of about
15 13 and a half percent. And if you look at Table
16 1 on page 5, you look -- you see what the
17 assigned dose is for. He was -- for external
18 exposure he was given 3.3 rem for photons and
19 another 3.3 rem for electrons, and also an
20 occupational medical exposure of 10.5 rem, and
21 also internal hypothetical exposures which also
22 give him another 11.65. So we've got a total of
23 28 -- really 29 rem of assigned dose to the skin
24 for this individual. And let's just briefly go
25 over.

1 As you can clearly see in context with 11 weeks,
2 an assigned dose of almost 29 rem is obviously a
3 very, very high dose. And in Table 2 we have the
4 checklist where we identify what we considered
5 were potential issues that we wanted to discuss,
6 and there were a total of five of them. And so
7 let's quickly go over them. This individual was
8 not monitored. So again, this was 1954, very
9 early on and he worked -- I assume he was a
10 chemist working with uranium and he was not
11 monitored, so now the question is what could have
12 been his exposure. And for claimant
13 favorability, the individual elected to assign
14 what at that time was a regulatory limit. And he
15 assigned it not just once, but twice. He
16 assigned 300 millirem from external photon per
17 week, plus an additional 300 millirem external to
18 electron, meaning that he was given a total of
19 600 millirem every week for the 11 weeks for
20 which he was -- during which he was employed.
21 And I looked at that and I sort of said the
22 procedures allow you to do that. It is a default
23 approach that is considered very claimant-
24 favorable and, as stated here on page 9, the dose
25 reconstruction based on administrative or

1 radiological monitoring (unintelligible) result
2 in a gross overestimation of the claimant's dose.
3 And I wasn't really sure to what extent we were
4 basically excessively so, because one could
5 conclude that a deep dose and a skin dose may
6 very well represent two different types of
7 radiation that could in essence be effective to a
8 part. But then I also looked at the NBS guidance
9 document, which was appropriate at the time, and
10 they give you essentially a 300 millirem skin
11 dose which in essence should have been a bind --
12 a bounding value. And so instead of giving the
13 guy a total of 600 millirem, I think it would
14 have been more than claimant-favorable by giving
15 him only 300 because at the time it was in fact
16 an NBS dose limit. And so again, we're being
17 excessive here in giving him a -- an exposure
18 dose limit, regulatory limit on two counts as
19 opposed to one.

20 The next one is the issue of assessing on-site
21 ambient dose. No on-site ambient dose was
22 estimated. Again, this is an area that could
23 have been because on-site ambient dose is
24 intended for those instances when a person is not
25 monitored, which he clearly wasn't. So in spite

1 of this overwhelming claimant-favorable approach
2 to assigning external exposure based on
3 regulatory limits twice, which I consider is
4 perhaps excessive, there was a deficiency when
5 the person maybe should have been given a
6 assigned ambient dose which is appropriate for a
7 person who was not monitored. Those were the two
8 issues on -- on -- under 2.2.1.

9 The next one was occupational medical exposure,
10 and that was clearly an issue here because this
11 person was there for 11 weeks which bridged two
12 years, 1953 and also 1954. And you could
13 reasonably -- as an outside limit -- say well, he
14 was given a chest x-ray on the day he took
15 employment and maybe after the first of the year
16 in 1954 where he only was there for four more
17 days, he was yet given another medical
18 occupational exposure of the chest x-ray. But
19 nowhere can you come up with a dose of 5.265 rem
20 for a chest X-ray. And so my concern here is
21 that this dose of a total of 10.5 rem for medical
22 occupational exposure is clearly a -- an error
23 here that cannot be supported by any procedure or
24 any documentation. And I guess my concern is
25 that this should have been caught as part of an

1 in-house audit before this -- this document was
2 released.

3 **MR. HINNEFELD:** Did -- did they use the
4 photofluoro or something? I can't imagine that
5 dose unless there's a photofluoro.

6 **MR. ALLEN:** It has to be to get that high.

7 **DR. BEHLING:** I mean I cannot imagine where this
8 dose comes from.

9 **MR. ALLEN:** It says flat out what table it came
10 from and I have to check that. I don't know the
11 numbers off the top of my head, but I can go
12 (unintelligible).

13 **DR. BEHLING:** He -- he lists the TIB-6 obviously
14 as his reference, and clearly nowhere in TIB-6 do
15 you come up with this kind of a dose. In fact,
16 if you look at the actual skin cancer -- which
17 turns out to be on the face -- which is on the
18 anterior side and you realize, you know, two
19 chest x-rays is possibly not even in the primary
20 beam and is on the exit side of the body.
21 Clearly, even if he had elected to use the skin
22 dose, which would have been on the posterior or
23 entrance side, that in itself would have been
24 excessive but certainly claimant-favorable --

25 **MR. HINNEFELD:** Yeah. Yeah, for a cancer high up

1 on the face.

2 **DR. BEHLING:** -- and how you come up with 5.6
3 some rem for each of the two exposures is
4 something that, you know, is a glaring error here
5 that should have really been caught by somebody
6 since you don't get that kind of a dose from two
7 X-rays. But anyway, so that was my concern here
8 is that somebody didn't catch this one as part of
9 the sign-off sheet.

10 **MR. HINNEFELD:** It's got to be a photofluoro
11 assumption, but even then it's got to be right in
12 the beam, too.

13 **DR. BEHLING:** I'll take a look at the DR report
14 and see what he states, whether it's not a chest
15 x-ray that he's making reference to. I don't
16 know if I quote him. I think he -- he makes
17 mention of a chest X-ray in the dose
18 reconstruction report, so...

19 **MS. BEHLING:** I guess the other question that I
20 have, the initial findings that Hans discussed,
21 are you in agreement with our conclusions or --
22 you know, because in this particular case there's
23 some -- this administrative -- this again opens
24 up some question to me as to when should they use
25 this administrative (unintelligible) --

1 **MR. HINNEFELD:** Well, the implementation guide
2 says that you really should probably only use
3 that for a period up to a year or less when you
4 apply the control limit. And so with 11 months,
5 that --

6 **DR. BEHLING:** Actually it's 11 weeks is --

7 **MS. BEHLING:** Eleven weeks.

8 **MR. HINNEFELD:** So 11 weeks there, they would
9 conform to the implementation guide --

10 **DR. BEHLING:** Yes.

11 **MR. HINNEFELD:** -- instruction on that.

12 **DR. BEHLING:** 300 millirem is --

13 **MR. HINNEFELD:** It would be 300.

14 **DR. BEHLING:** Yes.

15 **MR. HINNEFELD:** It wouldn't have been 600.

16 **DR. BEHLING:** 600 I'm sure is...

17 **MS. BEHLING:** Right.

18 **MR. HINNEFELD:** So I -- I think that's probably
19 correct. I think that's -- that's -- you're
20 right.

21 **MS. BEHLING:** Okay.

22 **MR. HINNEFELD:** But the approach for a short
23 period of time like that, for a few weeks,
24 applying the -- the radiation protection standard
25 that was in effect at the time is -- is a method

1 that's described in the implementation guide.

2 **DR. BEHLING:** I mean they were clearly claimant-
3 favorable on every turn.

4 **MR. HINNEFELD:** Right.

5 **DR. BEHLING:** The assigned dose, the -- the --
6 obviously I can't account for 10.5 rem for
7 medical occupational. And then you've got 20
8 radionuclides internal for a facility that
9 doesn't have a reactor. So all in all, I mean
10 this is --

11 **MR. HINNEFELD:** Right.

12 **DR. BEHLING:** -- unbelievably excessive dose
13 assigned to someone who may not have received
14 much of any kind of dose.

15 **MR. HINNEFELD:** Right.

16 **MR. GRIFFON:** Just a question on the
17 implementation guide, though. Does -- would that
18 apply to individuals -- say you had individuals -
19 - not this individual, but you had a case where
20 you had missing weeks or months in those early
21 years. Would you apply the administrative limit
22 that would be --

23 **MR. HINNEFELD:** Well, it would -- it would be an
24 option.

25 **MR. GRIFFON:** It would be an option.

1 **DR. BEHLING:** Co-worker data would be another
2 option.

3 **MR. HINNEFELD:** There may be other options --

4 **MR. GRIFFON:** Or other options.

5 **MR. HINNEFELD:** -- depending upon that particular
6 person.

7 **DR. BEHLING:** Maximum exposure for on-site for
8 anybody -- you know, these are all options.
9 Clearly this is the most extreme approach for
10 filling in gaps using regulatory limits.

11 **MR. GRIFFON:** Well, for this case I would -- I
12 would tend to agree with you. I'm not sure that
13 that's always the case.

14 **DR. BEHLING:** Yeah.

15 **MR. GRIFFON:** That's why -- that's why I raised
16 that point.

17 **DR. BEHLING:** Yeah.

18 **MR. GRIFFON:** Right.

19 **MR. HINNEFELD:** Right. It -- it -- like I said
20 there, it will either depend on, you know, the
21 case and what else do you know about the person.
22 And if it's a person who has some monitoring and
23 then gaps in their monitoring record, it -- that
24 -- it may be less likely to be used in that -- in
25 that context than in the context like this where

1 the person just worked for a few weeks.

2 **DR. BEHLING:** Okay. The next one is the one that
3 Mark had already raised the issue. It's the Iowa
4 claim and you may want to go on records to
5 stating we're not even going to discuss it.

6 **MR. HINNEFELD:** Yeah. I think that, based on the
7 Secretary's recent recommendation or finding of
8 Congress, that we won't be going through any Iowa
9 dose reconstruction approaches.

10 **DR. BEHLING:** We're now on tab 26, which is case
11 number 2668. And this involves a claim by a
12 person who was employed at the Savannah River
13 Site. And this person was there from early on in
14 1953 through the end of 1986. This person was an
15 operator/foreman/supervisor, so he held a number
16 of different jobs over that period of time. He
17 was diagnosed with colon cancer in 2001 which was
18 obviously there for about 15 years after he
19 terminated his employment. He worked in the 400-
20 D Area, as well as in 420-D facility. The dose
21 reconstruction -- and I always look at this.
22 Oftentimes they state up front whether or not
23 they're going to maximize the dose based on
24 obviously the type of cancer and potential
25 exposures in order for making the process more

1 efficient. They will tell you up front that
2 exposures were maximized as opposed to best
3 estimate where obviously the potential exists
4 that this person's exposure may bring him close
5 to the 50 percentile probability value, in which
6 case they tend to focus more on a best estimate
7 as opposed to a maximized estimate. And so on
8 the basis of that approach, they came up with a
9 dose of about 23.6 rem to the colon, and that
10 generated a POC value of 43.21 percent.
11 When you look at table number 1 on page 5 of the
12 review, you can kind of scan over the elements
13 that gave rise to his exposure. He was -- he had
14 a photon recorded dose and missed dose -- and
15 we're going to discuss that briefly -- so it's
16 both recorded and missed dose of about 7.3 rem.
17 He also had an environmental dose, external
18 photon, of about 1.3 and he was given a
19 hypothetical internal exposure which, when you
20 add the tritium and the alpha electron doses, you
21 end up with another 14.3. So it's really -- I
22 wouldn't say it's necessary (sic) a best
23 estimate. Anytime I see hypothetical, I tend to
24 say that this was also a combination of best
25 estimate and perhaps for external, but not

1 you, on the other side, see NIOSH computer values
2 which obviously are a combination, and you
3 realize that they are very, very similar. Very,
4 very similar.

5 **MR. HINNEFELD:** Uh-huh.

6 **DR. BEHLING:** In other words, for instance, I --
7 you look at 0.204 rem versus 0.191 rem. Now if
8 we're talking about less than -- well, we're
9 talking 13 millirem difference. And so I know
10 that I'm close. I just, you know -- and of
11 course that may be due to the uncertainty that
12 was assigned and so forth. So in doing this
13 manually, which took me quite a long time to do,
14 I was able to at least say we're in the ballpark.
15 The workbooks obviously must be very close to
16 what the generic procedures would dictate you do,
17 and therefore I can walk away from a few spot
18 checks and say the numbers are correct. But
19 again, we only wanted to point out that the
20 workbooks are something that we need to have
21 access to so when we encounter this we can go and
22 punch in the same numbers that these guys do and
23 say okay, rather than spend two days trying to
24 reproduce numbers here manually, we can -- we
25 can sign off on this.

1 Okay. Yeah. Well, there's -- there's -- the
2 next one is on-site ambient. And here's where I
3 guess I made a few comments about the various
4 options for on-site ambient doses. There are so
5 many options and again, I'm looking back on Task
6 3 that says okay, what are the procedures. Are
7 they functional? Are they user-friendly? Are
8 they consistent? Are they -- are they in a
9 position where you can say we balanced precision
10 against efficiency, meaning that let's not spend
11 an inordinate amount of time for things that
12 really don't matter significantly. And I sort of
13 looked at the TBD in that light and looked at the
14 options that are described in the TBD. And in
15 the case of on-site ambient -- again, if you look
16 at Table 4, you see the various ORAU-TBD-3
17 procedures that allow you to calculate the on-
18 site ambient dose as under option 1, and then
19 under option 2, 3, and 4. And based on these
20 different options and you compare that to the
21 very bottom, it has NIOSH dose reconstruction
22 report maximized where you see a parameter one
23 input of 39 millirem as opposed to 58, 52, and
24 65. And -- and again, I was not in a position to
25 -- to reproduce these numbers. Again, the

1 question is, is it really worth all these efforts
2 to come up with a dose that varies between 39 and
3 52 or 58, especially when you realize the effort
4 you have to go through in coming up with these
5 values and the various tables you have to consult
6 and so forth. The truth is, perhaps there should
7 be -- like they have done in so many instances
8 for others, like Hanford where you say where's
9 the maximum annual dose for on-site ambient and
10 we'll just generously put the guy always there
11 every year regardless of where he may have
12 worked. And the truth is, in most instances it's
13 your real dose that doesn't require or -- or that
14 shouldn't require a large investment of time.
15 And that was my point here is that we have all
16 these different options, and 50th percentile and
17 95th percentile and GSD values. And for a guy
18 who worked there for 15, 20 years in different
19 locations, you can spend a lot of time chasing
20 these numbers down and trying to enter them into
21 IREP. And I question again, based on this
22 regulatory requirement to balance precision
23 against efficiency, is this efficiency? Or is
24 this an awful lot of time spent in trying to
25 calculate a dose that in the end contributes only

1 marginal. And I say this in context with the
2 fact that when you get to the point where you
3 give a hypothetical internal for 20 years, all of
4 a sudden you're dealing with this huge dose that
5 we know for a fact is not a real dose. And in
6 one instance you're trying to be definitively
7 accurate and chasing this guy from one location
8 to the other and giving values of geometric
9 standard deviations, and then in the next
10 instance say, oh, what the hell, give him 28
11 radionuclides for hypothetical and -- and -- and
12 realize that that level of accuracy has just been
13 tossed to -- to the winds. And that was the
14 point here in going through that exercise.

15 **MR. HINNEFELD:** Yeah.

16 **MS. BEHLING:** One of the other issues that I
17 might raise here is it appears, once we found out
18 about the workbooks and the spreadsheets, that
19 they are starting to develop a lot of the
20 spreadsheets I believe or workbooks for the on-
21 site ambient environmental doses for site-
22 specific cases. So possibly this type of thing,
23 after we get some training here, helps to
24 eliminate all of these options that these -- that
25 these people, the dose reconstructors, have at

1 this point in time. I don't know if that was
2 their thinking in developing these workbooks.

3 **MR. ALLEN:** The tools you're going to see --

4 **MS. BEHLING:** Yes.

5 **MR. ALLEN:** -- it includes ambient; it includes
6 X-ray. And they have an option to basically
7 maximize things or to go hardcore. Monte Carlo,
8 if they hit that then it takes a little while to
9 -- to grind through it all and it spits out an
10 answer for them --

11 **MS. BEHLING:** I see.

12 **MR. ALLEN:** -- based on the tables in the TBD.
13 It's going through all the methodology and that
14 external implementation guide. And you're right,
15 it's -- it's very tedious if you had to calculate
16 it by hand, but that's why they've put in their -
17 -

18 **MS. BEHLING:** They're starting --

19 **MR. ALLEN:** -- tool, to be able to do that. And
20 like I said, you'll be seeing those tomorrow.

21 **MS. BEHLING:** Okay.

22 **MR. ALLEN:** Tomorrow --

23 **MS. BEHLING:** Tomorrow --

24 **MR. HINNEFELD:** Starts tomorrow afternoon.

25 **MS. BEHLING:** Tomorrow afternoon. Yeah. Because

1 -- and not to trivialize the on-site ambient dose
2 either, because I know in one of the Fernald
3 cases that I did, Fernald in the early years,
4 they've developed a spreadsheet that I, you know,
5 picked up and could easily determine what they
6 were doing. And I calculated for that particular
7 case 9 rem of on-site ambient dose. So like I
8 said, I think they are developing these workbooks
9 and spreadsheets in order to -- to help the dose
10 reconstructors.

11 **DR. BEHLING:** Yeah. And -- and -- and I don't
12 want to minimize on-site ambient. You look at
13 Hanford site in the late '40s. They released, in
14 some instances for early years, something in the
15 order of one million curies of iodine-131,
16 meaning that you would get both a whopping
17 immersion dose external, and certainly a whopping
18 thyroid dose from those. So I don't want to
19 minimize the impact of on-site ambient. But in
20 those instances where you fully understand that -
21 - you know, John Till's word that the exposures
22 were very, very low, perhaps a time-saving thing
23 would be to develop -- as they have in other
24 facilities, saying where's the maximum dose for
25 the 2000 hours or the 2600 hours a year and put

1 the guy there, which will be claimant-favorable
2 and it usually doesn't amount that much to a
3 dose. But it's claimant-favorable and certainly
4 saves an awful lot of time.

5 **MR. HINNEFELD:** Right. Okay.

6 **DR. BEHLING:** Occupational medical exposures,
7 again, I looked at that. And I looked at the TBD
8 for numbers, and I came up with values that are
9 somewhat different. Again, extremely trivial in
10 differences, but nevertheless they -- they differ
11 to some extent. We're talking, you know,
12 millirem quantities here. But again, it's just
13 simply a number that I couldn't reproduce.

14 **MR. ALLEN:** Some of these minor differences
15 you're saying might be just the timing on when
16 the --

17 **DR. BEHLING:** Yes.

18 **MR. ALLEN:** -- dose reconstruction was done and
19 the revisions of the TBD?

20 **DR. BEHLING:** Yes. I mean the -- the
21 occupational medical, you're talking very
22 trivial, talking a few millirem.

23 (Whereupon, Dr. Roessler returns to the
24 discussion.)

25 **MS. BEHLING:** Although I will tell you, we do

1 look at when -- we try to look at when that dose
2 reconstruction was done, and go back into the
3 archives to get the right Rev. of the TBD -- if I
4 could only do that.

5 **DR. BEHLING:** I'll tell you what, in some cases
6 the dose reconstructor doesn't make the proper
7 reference. He will, for instance, use a -- a
8 reference -- for instance, what is it, the ORAU-
9 PROC triple --

10 **MS. BEHLING:** No, it's -- it's either PROC 6 or
11 it's --

12 **DR. BEHLING:** -- 6, and they have attachments and
13 the attachments came out subsequently. And he
14 will give you the original issue date, and yet he
15 will reference Attachment E.

16 **MS. BEHLING:** Right.

17 **DR. BEHLING:** And you realize you can't even go
18 by that because Attachment E didn't exist back in
19 the early version of the TBD.

20 **MR. HINNEFELD:** Right.

21 **MS. BEHLING:** We talked about that during --

22 **DR. BEHLING:** Or -- or the procedure, so again,
23 you know, when you -- when you see all -- this is
24 in compliance with Attachment E and you look at
25 the reference and the issue date, and you use the

1 wrong date so --

2 **MS. BEHLING:** And we talked about that for the
3 first 20 cases, and it had to do with, as you
4 say, and I think that Attachment E and F of the
5 ORAU-PROC procedure that was Hanford-specific
6 guidance --

7 **MR. HINNEFELD:** Yeah.

8 **MS. BEHLING:** -- and they gave the wrong
9 reference. But quite honestly, we now -- because
10 -- as we've also belabored on the first set of
11 20, because the dose reconstruction reports are
12 not always very clear and they're not thorough
13 enough, I do look at that initial date and don't
14 always just base it on what the reference might
15 be so that we're sure that we're using the
16 documentation that he -- that he or she was
17 using.

18 **DR. BEHLING:** Yeah. It's -- it's clear obviously
19 when you see a date completed, that if it pre-
20 dates the -- an amendment, that he couldn't have
21 used it. So I will go back and actually use the
22 ones that he would have had access to, because
23 I'm not -- I'm not going to hold somebody
24 accountable for a procedure that changed
25 subsequently, you know --

1 **MR. HINNEFELD:** Right.

2 **DR. BEHLING:** -- that's -- I just think it would
3 not be fair to the dose reconstructor.

4 **MR. HINNEFELD:** And I think we've changed the
5 referencing practices since those first 20. Now
6 they won't probably be reflected in any of the
7 dose reconstructions that have been selected for
8 review, but I think we have told -- you know,
9 pointed out to them that when you're referencing
10 something that has page changes, you've got to --
11 you've got to indicate that you're referencing
12 the one with the page changes by date or by PC
13 number or something.

14 **DR. BEHLING:** Yeah, and as --

15 **MR. HINNEFELD:** We've told them that.

16 **DR. BEHLING:** As it indicates in our
17 recommendation, sometimes the dose reconstructor
18 will say "and in accordance with TBD" and they
19 list the whole TBD and, you know, I mean this is
20 like 200-some odd pages.

21 **MR. HINNEFELD:** Two hundred pages, right.

22 **DR. BEHLING:** Wouldn't it be nice to tell me
23 which -- which table you used?

24 **MR. GRIFFON:** Zero in a little bit?

25 **MR. HINNEFELD:** Could be a tactic.

1 **DR. BEHLING:** Especially for the neutron dose
2 reconstruction at the Savannah River Site. It
3 would be nice to tell me which table came -- you
4 used for this thing. But, you know, they make
5 you work for your living.

6 Anyway, the last -- the next one's on page 16,
7 but these are again issues that we've talked
8 about before and now were brought up by Joyce
9 Lipsztein when she first identified the issue of
10 the organic tritium exposures, which we know is
11 not likely to be significant based on the
12 likelihood that at best a small portion of
13 tritium exposures. And again, these are
14 hypothetical on top of it. We're talking about
15 tritium exposures that were not recorded based on
16 5 microcuries per liter. But we deferred to --
17 to the review of the Savannah River TBD on this
18 one, the issue involving the -- the potential
19 exposures for organified tritium, which would
20 give a -- perhaps up to a 2.3-fold higher dose
21 based on a longer residence time in the body, et
22 cetera and --

23 **MR. GRIFFON:** Can I --

24 **DR. BEHLING:** -- and the other issue --

25 **MR. GRIFFON:** -- ask for clarification on that?

1 That's not listed in the matrix.

2 **DR. BEHLING:** No.

3 **MR. GRIFFON:** Those ones? And why is that?

4 **MS. BEHLING:** I should have done that. I'm
5 sorry.

6 **MR. GRIFFON:** I know we've covered it in the
7 past.

8 **MS. BEHLING:** Yes, we have.

9 **MR. GRIFFON:** But it's still kind of an
10 outstanding --

11 **MS. BEHLING:** Yes, we have.

12 **DR. BEHLING:** It's an outstanding issue of the
13 TBD.

14 **MS. BEHLING:** I'm sorry. Yes.

15 **MR. GRIFFON:** Yeah.

16 **DR. BEHLING:** I mean if -- if we can all concur
17 that organified tritium is such an insignificant
18 fraction of total tritium, then that issue should
19 be something that we can ignore. And the other
20 issue was the ICRP 30 versus 68 issue.

21 **MR. GRIFFON:** Right, right, those two --

22 **DR. BEHLING:** And, you know, in extreme
23 conditions, as Joyce pointed out, that those can
24 be higher. But in many other instances it's
25 actually more favorable to apply the ICRP 30

1 data.

2 **MR. HINNEFELD:** Right.

3 **DR. BEHLING:** And so again, this is an issue that
4 needs to be hacked out and resolved at a level
5 that involves Task 3 as opposed to Task 4.

6 **MR. HINNEFELD:** Yeah.

7 **MS. BEHLING:** But they should be included in the
8 matrix. I apologize.

9 **DR. BEHLING:** Okay.

10 **MR. HINNEFELD:** Okay.

11 **MR. GRIFFON:** Can I -- for case 27 I have one
12 other thing. I was going to raise those two but
13 you covered them. Going back to the same theme
14 here but with the Savannah River, I'm looking at
15 this individual -- and it applies to the next
16 case, too. They -- the monitoring for this
17 person is very sporadic and I guess the
18 assumption is that if they were monitored, they
19 should have been monitored. If there was no
20 data, they worked in an area where they weren't
21 required to be monitored or -- am I to conclude
22 that all these blanks are -- are they -- they
23 didn't require monitoring? I mean I see cycle
24 and then a -- cycle 7, sometimes cycle 2, 6, and
25 9. I'm assuming that --

1 **MR. HINNEFELD:** Well, there's a time period at
2 Savannah River when --

3 **MR. GRIFFON:** I'm trying to understand what these
4 records mean.

5 **MR. HINNEFELD:** I don't remember the timing off
6 the top of my head, or what years it was, but
7 there was a period of time when this record
8 didn't reflect zeroes, so those could be -- those
9 could be like 00 readings. Like in this case,
10 you know, you've got a 30 shallow so there --
11 it'll show a zero but --

12 **MR. GRIFFON:** Right.

13 **MR. HINNEFELD:** -- you won't see any 00 readings
14 in these. There was a period of time when that's
15 not evidence of not monitoring. That would --
16 that would be evidence actually of either not
17 monitored or a 00 reading on that. And I don't
18 remember the year --

19 **MR. GRIFFON:** Oh, okay.

20 **MR. HINNEFELD:** -- the exact year that Savannah
21 River went (unintelligible). But it wouldn't be
22 uncommon in this case to consider them as 00's
23 for the dose reconstruction.

24 **MR. ALLEN:** Right, and that's what they did in
25 this particular guy.

1 **MR. HINNEFELD:** -- the difference. I don't know
2 that you know positively for sure on this record.

3 **MR. GRIFFON:** For instance, whether a person --

4 **MR. ALLEN:** That's part of digging into sites and
5 the site records and what they mean in different
6 years and different records, and I think this one
7 for Savannah River changed from one period to the
8 next. At one point they recorded --

9 **MR. HINNEFELD:** Yeah. There -- there is another
10 -- certain periods of time when you look at this
11 record, that are 00's in this record. I forget
12 what the timing is.

13 **DR. BEHLING:** It's 1970 through '88 I believe.

14 **MR. HINNEFELD:** '70 through '88 is when they
15 don't list the 00's.

16 **MR. GRIFFON:** Okay.

17 **MR. HINNEFELD:** So --

18 **MR. GRIFFON:** Later, I think you're right. I
19 think it was 00's.

20 **MR. HINNEFELD:** I think we would probably -- our
21 approach on these would probably be that he was -
22 - he had a 00 reading on his badge. And if he
23 didn't, if he was unmonitored during that period,
24 given the Savannah River badging practices, we
25 figure he was probably less exposed than somebody

1 who was monitored and had a zero. And so we'd be
2 bounding his -- his exposure by figuring he was
3 monitored and had zero.

4 **MR. GRIFFON:** Okay. But that -- that presumes
5 that the program is working a hundred percent
6 accurately.

7 **MR. HINNEFELD:** It presumes it works, yeah.
8 Well, yeah. There's a certain presumption that
9 they badged the people that needed to be badged
10 at a particular time and in a particular
11 population, 'cause for a construction worker, we
12 wouldn't necessarily make that --

13 **MR. GRIFFON:** Right.

14 **MR. HINNEFELD:** -- draw that conclusion.

15 **MR. GRIFFON:** I understand it better. I -- I
16 still -- I guess -- I know it's site-specific and
17 I -- is it to some extent covered in the site
18 profile document? Some of them seem to have --

19 **MR. HINNEFELD:** Some of them -- I won't say they
20 will all do a great job.

21 **MR. GRIFFON:** Right.

22 **MR. HINNEFELD:** Some of them do and some of them
23 don't.

24 **MR. GRIFFON:** 'Cause it can be confus-- the
25 reason I raised it is it can be confusing. And

1 also, you know, if -- if an individu-- you know,
2 if an individual says that they -- especially if
3 in the CATI interview they raise questions on,
4 you know, concerns about their badges being
5 accurate. I think then, you know, it raises that
6 to a higher level where you owe it to them to
7 investigate it further maybe, or something like
8 that.

9 **MS. BEHLING:** I think in this particular issue,
10 because of using these workbooks, it was
11 difficult for us to pull out missed from
12 recorded.

13 **DR. BEHLING:** Because they mixed them.

14 **MS. BEHLING:** Yeah, they mixed them.

15 **MR. ALLEN:** The final answer is all mixed
16 together.

17 **MS. BEHLING:** Exactly, and so we couldn't
18 determine --

19 **DR. BEHLING:** Yeah. I can -- I can look at, for
20 instance, the -- the input to the IREP, you know,
21 in Appendix A and the assigned recorded/missed
22 doses start with entry number 201 and go all the
23 way to 268. And you can look at these and
24 realize obviously a computer program was used
25 because you see a -- alternation between

1 lognormal, normal, lognormal distribution, and
2 then you look at the -- the geometric standard
3 deviation which oscillates about 1.52 and you
4 realize that we're talking mostly missed dose
5 here in most of these cases here and -- and this
6 is how they arrived at their numbers. But it was
7 very difficult for me to follow because of the
8 fact that they blended these two. And you have
9 to go through there and sort of say okay, what
10 were the change-out cycles for that period of
11 time and, on the assumption that it was purely
12 missed dose, what should have been the value, et
13 cetera, et cetera. And I did as much as I could
14 without the benefit of the spreadsheet or
15 workbook to -- to track this, and they looked
16 okay. And I looked at the dosimetry record.

17 **MR. GRIFFON:** And I know what -- I know what
18 you're saying too, that you're looking for things
19 that don't look normal for certain time periods
20 for certain sites, and yeah, if you've got some
21 protocols in mind when you're going through
22 these. I guess it would help us to see those in
23 the site profile to some extent. I don't --

24 **DR. BEHLING:** Well, there are a whole host of
25 Savannah River Site procedures which are outside

1 of the site profile --

2 **MR. GRIFFON:** Right.

3 **DR. BEHLING:** -- that are among the procedures we
4 reviewed that -- strictly dedicated to Savannah
5 River, including this period of time that I guess
6 spans from around 1970 to 1988 where doses were
7 not recorded because zeroes were not simply
8 recorded, or -- or modest doses. Whatever they
9 did, they did not record those dose values --

10 **MR. GRIFFON:** Right.

11 **DR. BEHLING:** -- that period of time.

12 **MR. GRIFFON:** Yeah. There's got to be some set
13 of records at the site that show those zeroes
14 somewhere, though. Right? I mean...

15 **MR. HINNEFELD:** I don't know what to tell you
16 about Savannah River.

17 **MR. GRIFFON:** I guess -- I guess part of what I'm
18 looking at is the validation, and it probably
19 doesn't have to be done on each case, but if you
20 had data that you can -- that says -- that says
21 to the public that this final database from
22 Savannah River is accurate; We checked it, we did
23 some -- we did some --

24 **MR. ALLEN:** Validation of data --

25 **MR. GRIFFON:** I'm not -- I'm not talk -- I know

1 Jim Neton --

2 **MR. ALLEN:** I really don't know.

3 **MR. GRIFFON:** -- sometimes accuses me of --

4 **MR. ALLEN:** I understand what you're saying.

5 **MR. GRIFFON:** I'm not talking a hundred percent.

6 I'm saying do some random sampling and take a

7 case back and say okay, for this individual it

8 says cycle 12, 15 millirem, but actually we -- we

9 went back and found (unintelligible) --

10 **MR. HINNEFELD:** Try to look at all those other

11 cycles.

12 **MR. GRIFFON:** -- records, and he had zeroes for

13 all the other cycles.

14 **MR. ALLEN:** (Unintelligible) the records are in

15 there.

16 **MR. HINNEFELD:** Yeah. Well, I don't --

17 **MR. GRIFFON:** I think those are. I don't know.

18 I didn't -- this is the first I'm scanning this

19 case so, you know, but...

20 **MR. ALLEN:** I can't recall every site because

21 they're all so different but --

22 **MR. HINNEFELD:** Yeah, I know.

23 **MR. ALLEN:** That looks like a summary for that

24 guy he's underlined there.

25 **MR. GRIFFON:** Yeah. Yeah.

1 **MR. ALLEN:** I think that's -- Okay. That's for
2 the year, nothing for the quarter there. Yeah,
3 so that might be --

4 **MR. GRIFFON:** That sort of does show the zero
5 there. You're right. Yeah.

6 **MR. ALLEN:** Yeah.

7 **MR. GRIFFON:** Okay.

8 **MR. HINNEFELD:** There's some things that -- I
9 don't know what every site retained in terms of
10 individual dosimeter results. It could be that -
11 -

12 **MR. ALLEN:** Some are obviously better than
13 others.

14 **MR. GRIFFON:** Right, right, right.

15 **MR. HINNEFELD:** They accumulated them in the
16 quarterly reports and may not --

17 **MR. GRIFFON:** I guess something -- something to
18 say, you know, this was the protocol for certain
19 time periods at Savannah River and we validated
20 that was in fact practiced --

21 **MR. HINNEFELD:** By looking at original record --

22 **MR. GRIFFON:** Exactly.

23 **MR. HINNEFELD:** -- like film badge --

24 **MR. GRIFFON:** A sampling. A sampling of original
25 records, you know.

1 **MR. HINNEFELD:** I don't -- I don't know.

2 **MR. GRIFFON:** Yeah.

3 **MR. HINNEFELD:** I don't -- I don't know that
4 every site would have a --

5 **MR. GRIFFON:** No, I know.

6 **MR. HINNEFELD:** -- a record --

7 **MR. GRIFFON:** You're not going to always be able
8 to do it. Right.

9 **MR. HINNEFELD:** -- you can go back to the
10 original record and do that.

11 **MR. GRIFFON:** I'm saying to the extent possible,
12 I think that -- you know, again, that charge of -
13 - or the concern of the public of well, you're
14 just using DOE's records again.

15 **MR. HINNEFELD:** Yeah, and they were lying through
16 their teeth the whole time.

17 **MR. GRIFFON:** Well, they're all DOE's records,
18 but if we can go back beyond the database, maybe
19 that -- that gives a -- you know, you -- you made
20 attempts to validate.

21 **MR. HINNEFELD:** Yeah. Yeah. Yeah, I --

22 **MR. GRIFFON:** That's --

23 **MR. HINNEFELD:** I don't know what's -- I guess
24 I'm not -- I don't know what's been done or --

25 **MR. GRIFFON:** Yeah. And the only other comment -

1 - this is a general comment again, not
2 necessarily in this particular case because I
3 think the POC was pretty -- pretty low. But the
4 -- the question of whether you cross-walked --
5 sort of cross-walked the work history with those
6 records to say okay, he, you know, he -- he was
7 taken on and off of monitoring. I mean here they
8 could have been zeroes, but say a person was
9 taken on and off of monitoring --

10 **MR. HINNEFELD:** Uh-huh.

11 **MR. GRIFFON:** -- does it make sense, given his
12 work history --

13 **MR. HINNEFELD:** Well, that -- that -- actually at
14 Savannah River there is an opportunity to do some
15 of that --

16 **MR. GRIFFON:** Right. Right.

17 **MR. HINNEFELD:** -- because if they've got a
18 bioassay record, you've got an indication of
19 where they were when they left the bioassay
20 sample on the bioassay card.

21 **MR. GRIFFON:** Right.

22 **MR. HINNEFELD:** And there are certain level
23 locations, like in the heavy water facility which
24 is in the 400 area --

25 **MR. GRIFFON:** Yeah.

1 **MR. HINNEFELD:** -- at Savannah River, they didn't
2 require monitoring --

3 **MR. GRIFFON:** And it was --

4 **MR. HINNEFELD:** -- for the longest time.

5 **MR. GRIFFON:** So then you could say, you know, we
6 assigned missed dose. Even though there was no
7 record, we assigned missed dose and this seems
8 consistent with the person's work history, that
9 they probably weren't in those areas requiring
10 monitoring --

11 **MR. HINNEFELD:** Yeah.

12 **MR. GRIFFON:** -- or something to that --

13 **MR. HINNEFELD:** Right.

14 **MR. GRIFFON:** Yeah.

15 **DR. BEHLING:** The next one is tab 28. It's claim
16 number 6257 for the Savannah River Site. And
17 this individual worked at the Savannah River Site
18 from August '78 to October 1995. The individual
19 was diagnosed with skin cancers, basal cell
20 carcinomas, on four separate occasions in --
21 basically in sets of two. The first two skin
22 cancers were found on the right side of the neck,
23 and they were diagnosed in '95. And the second
24 skin cancer in the upper right back was diagnosed
25 a few days later on March 17th, '95. So you have

1 two sets of skin cancers, in essence a few days
2 apart. And then two additional cancers were
3 identified in June of 2001 on the middle of the
4 back and the final, fourth skin cancer is on the
5 left side of the neck. So you had a total of
6 four cancers. The first two coincided in time
7 and the second two coincided in time, so you can
8 basically view them as two -- two types of
9 cancers.

10 He worked as a pipe fitter, and again NIOSH
11 states that this dose reconstruction was
12 performed using best estimates. For skin dose
13 exposures NIOSH divides it again for the first
14 two and the second two. So what you have --
15 well, I'll get to that in a second. But for the
16 assigned dose of -- what do we have here, about
17 11 -- between 11.6 and 11.9 rem to the skin, a
18 POC value of 43.87 percent. So we're -- we're at
19 the threshold of compensation, at least according
20 to the POC.

21 If you look at the Table 1 on page 5 of the
22 report you see that appendix --you have two
23 appendices, Appendix A-1, and Appendix A-2, and
24 they each correspond to the first two sets of
25 skin cancer and the second two skin cancers as

1 appendix A-2. So you have two different sets.
2 Now, obviously the two will share the kind of
3 exposure up until the time of the first
4 diagnosis, and of course, the second two skin
5 cancer will have additional exposure beyond the
6 diagnosis of the first two, and that's why
7 they're different. And you can look down the
8 list here and see where did the doses come from.
9 Obviously there was a -- again, a combination of
10 photon dose for photon energies, 30-250, greater
11 than 250 plus electron dose and missed dose, and
12 they were all thrown into a single bucket. And
13 so again it made the audit of this whole dose
14 reconstruction quite complicated. But you see
15 that for photon/electron recorded and missed
16 dose, you have about a total of 6 rem assigned.
17 And then you have some additional occupational
18 medical and some environmental dose, and you have
19 internal assigned doses from tritium and other
20 radionuclides that collectively contribute to the
21 dose of about 11 to 12 rem for -- for different
22 cancers.

23 When you go to Table 2 on page 7, again you see
24 what we already discussed in a previous case, a
25 lot of checkmarks with an asterisk that

1 identifies the issue of the workbooks which we
2 already said may resolve itself in the next day
3 or so. Again, based on our inability to really
4 follow each of the numbers based on the fact that
5 we had a very complex dose reconstruction
6 procedure that was broken up by photon energies
7 plus electrons and recorded dose with missed
8 dose, we had a very difficult time in really
9 understanding how each of the various numbers
10 came to be. Nevertheless, we -- we had some
11 comments.

12 As you can see, on page 9 where we describe the
13 recorded photon/electron doses, how it was
14 defined in the DR. They segregated it on the
15 basis of 30 to 250 keV photons and greater than
16 250, plus the greater than (unintelligible) keV
17 electrons. And I guess one of the things that --
18 I hoped to touch on this earlier with Dr.
19 Roessler on the issue of is it really that
20 critical to segregate for IREP these different
21 energies. Does it really have a purpose. Can --
22 can this even be justified based on relative
23 effectiveness factor that is defined by different
24 photon energies versus electron. I don't really
25 have the answer. I know that David Coker had

1 presented something to the Board some time ago
2 where he obviously showed some scientific basis
3 for making that, but I haven't seen it so I've
4 have to say this really complicates dose
5 reconstruction when you have to go through each
6 of these segregations, especially for skin
7 cancers where you have to deal with a low energy
8 photon and electron dose, et cetera, et cetera.
9 And if you track a guy like this over a period of
10 years for our facility, you can get yourself
11 bogged down very quickly into a complex dose
12 reconstruction protocol, to say the least.
13 And of course, then comes the issue of the
14 anterior, the DR further reports -- I'm reading
15 on page 9 -- the DR report further states that
16 for external exposure 100 percent anterior-
17 posterior. And again, I'm looking at that and
18 saying well, if you have a skin cancer on the
19 back -- side and back of your neck, is it really
20 even reasonable to assume an electron dose can be
21 half of an anterior-posterior geometry? Now I
22 know it's claimant-favorable because the DCF
23 tells you it's claimant-favorable, but it sure
24 doesn't make much sense from a scientific point
25 of view to talk about an electron dose when the

1 exposure geometries assume anterior-posterior.
2 And we're talking about a skin cancer on a guy's
3 back, and -- and simple first principles tell you
4 that photon energies less than 30 keV invaders
5 will never get there.

6 So anyway, I make a couple comments here that,
7 you know, it's just me talking as a scientist as
8 opposed to saying what is more claimant-favorable
9 in our assumptions. But really, you know, there
10 are some issues here that I just discussed here
11 that may or may not be resolved based on the fact
12 of claimant-favorability and simplicity we'll say
13 you have to make a decision about exposure
14 geometry. In this case AP geometry was selected.
15 But I do also want to make a comment about that
16 because the appendix B is wrong in some of the
17 DCF values because, especially for skin, they
18 will give you skin values that assume that the
19 dosimeter was not on the -- on the chest. I mean
20 ultimately we always have to convert, especially
21 for recorded dose, what the dosimeter recorded.
22 And when it's worn on the chest you can make an
23 assumption about the DCF, make an assumption that
24 the dosimeter was in fact on the back side, which
25 is frequently the case for -- and I made that

1 comment in my Task 3 report. The DCF values for
2 PA geometry exposures are wrong, and so are those
3 for -- for rotational isotropy because they're
4 based on assumptions that do not hold.

5 Operational health physics tells you when you
6 hand a guy a TLD, he wears it right here and --
7 and therefore the DCFs, as they are defined in
8 appendix B as well as in -- in procedure number
9 6, are wrong.

10 Again, I -- I made some attempts to calculate it,
11 and on page 12 and 13 I -- I talk about what I
12 would have calculated. And again, my
13 calculations suggest that I would have arrived at
14 a dose of 4.045 rem and the dose that were
15 recorded here were 3.583, and in the paragraph
16 that follows, about 3.5, 3.6 rem versus 4, we're
17 talking about 500 millirem as a difference.

18 Again, it's something that the workbooks probably
19 would account for, but I couldn't when I did it
20 manually on a spot check basis. I guess the --
21 the findings on page 13 are obviously issues that
22 I already touched upon, the assumption of a skin
23 dose and AP geometry that simply doesn't make
24 much sense when you talk about the different
25 locations for the four skin cancers. You could

1 spend a good number of hours on this one.

2 **MR. ALLEN:** It looks that way.

3 **MS. BEHLING:** Is the issue of why --

4 **DR. BEHLING:** Yeah. On -- on page 14 I found an
5 inconsistency here that -- under statement two
6 for external doses that include recorded missed
7 dose, I take it that right there for the cancer
8 that was diagnosed in 1995, this included an
9 external photon dose of 3.231 rem and external
10 electron dose of 4 -- and so for -- and then I
11 compare that to the year 2001 and you realize
12 that's impossible where you can have a larger
13 dose of let's say the 4.285 versus the 4.262 for
14 the year 2000, realizing there were an additional
15 six years of exposure from internal that would
16 have obviously had more dose. So it's a
17 theoretical impossibility. I don't know how that
18 came to be.

19 **MR. ALLEN:** I don't think those doses you're
20 quoting include the internal, do they?

21 **DR. BEHLING:** Yeah, I think they do. Yeah, yeah.
22 Yeah, the internal dose here is 4. -- in fact,
23 those two numbers are highlighted, the 4.285 and
24 -- and the 4.091, so forth -- and I -- yeah, the
25 doses -- it's -- you know, again, it's trivial

1 when you talk about a few millirems, but it's
2 just something that doesn't seem to make
3 scientific sense where you have a higher dose for
4 a shorter exposure period for the first two as
5 opposed to the second two with the identical
6 assumptions.

7 **MS. BEHLING:** Again, I think that's computer-
8 generated --

9 **DR. BEHLING:** Yeah, it's probably --

10 **MS. BEHLING:** -- numbers that --

11 **DR. BEHLING:** This may be a statistical error
12 when you cycle through the -- the Monte Carlo,
13 that may be, you know, the reason. I don't know.
14 But it's quite trivial.

15 **MR. ALLEN:** I haven't had a chance to dig into
16 deep yet, but there -- it could be a random
17 number.

18 **DR. BEHLING:** Yeah. It could be a random number
19 since we were doing, you know, you're doing a
20 Monte Carlo.

21 **MR. ALLEN:** It could also be an entry error.

22 **DR. BEHLING:** Yeah. One of the things that I've
23 always felt when we have -- when you use the --
24 the -- I'm on page 15. I'm talking about the --
25 the ORAU-PROC 6 as well as the appendix B in the

1 implementation guide. When you have a DCF for
2 skin, they give it to you for an HP-10 dose and
3 your kerma dose or air exposure dose and so
4 forth, but when you have an HP-10 dose, you
5 should really not have to deal with a skin dose
6 because invariably you also have a shallow dose,
7 and shouldn't that be your -- your dose and
8 ignore the whole concept of a DCF. I -- I can't
9 -- I can't really grasp the concept of an HP-10
10 dose with a DCF to give you a skin dose when in
11 fact you should have really a 7 millirem dose
12 that defines the dose to the skin.

13 **MR. ALLEN:** I'm trying to think of a situation.

14 **MR. HINNEFELD:** Certainly at the time when the
15 site was recording HP-10 they were also recording
16 HP-07.

17 **DR. BEHLING:** Yeah.

18 **MR. HINNEFELD:** So at that point you wouldn't
19 need them to have a DCF on an HP-10 number.
20 There are cases when we've made adjustments in
21 the recorded values at a site to say that if you
22 make this adjustment, you can treat the doses as
23 HP-10. That's about 1.19 at Savannah River and
24 these are other periods that -- at Hanford when
25 we made that kind of an adjustment on the

1 recorded dose and (unintelligible) recorded dose
2 as HP-10, the deep dose as HP-10, when they may
3 not have been recording an HP-07, they may have
4 recorded in some other fashion.

5 **DR. BEHLING:** Yeah.

6 **MR. HINNEFELD:** So it's -- it's really --

7 **DR. BEHLING:** I don't have the (unintelligible)
8 facts of it --

9 **MR. HINNEFELD:** Yeah.

10 **DR. BEHLING:** Because of the weight factor, I
11 didn't bring mine. But if you have the appendix
12 B on the skin, I don't know if the DCF for --
13 let's say greater than 250 or 30 to 250, what the
14 DCF values are for skin for HP-10. Is it greater
15 than -- is it 1?

16 **MR. HINNEFELD:** It's usually less than 1.

17 **MS. BEHLING:** It's less than 1.

18 **DR. BEHLING:** Yeah. And this is what -- what
19 conflicts here. Obviously there's no theoretical
20 way that a deep dose at a -- at a 10 millimeter
21 depth should be anything less than -- than would
22 -- that the skin dose should be less than what it
23 is at 10 millimeters. So I'm -- I'm sort of
24 looking at these numbers, whether it's the AP or
25 PA geometry and I'm looking at a organ -- a skin

1 dose, HP-10, for -- for 30 to 250 keV of 0.677
2 for the AP geometry and 0.674 for the PA geometry
3 and so forth -- and to me it doesn't make any
4 sense. I mean you have as a minimum, depending -
5 - I mean not depending. Obviously you will have
6 some attenuation in your first centimeter of
7 tissue that records this as a dose. Wouldn't you
8 expect by a default a -- a 7 millirem dose would
9 be greater and therefore the DCF should be at
10 least 1 or possibly slightly greater than 1. I
11 can't think of why a DCF that is recorded on my
12 badge, and let's say my badge records exactly and
13 I'm at the AP geometry, I'm facing the source,
14 and it records 1 rem, HP-10. What should be my
15 skin dose? My skin dose should be greater than -
16 - than 1 rem.

17 **MR. HINNEFELD:** The basis would be that if the
18 attenuation from the skin to 1 centimeter is
19 small, is very small, that it would be the energy
20 deposition rate from -- from -- as you go from
21 the air into the skin, and you have to build up
22 in the energy deposition as you go into the skin.
23 So --

24 **DR. BEHLING:** I would say --

25 **MR. HINNEFELD:** -- that would be the basis.

1 **DR. BEHLING:** Yeah. What we're talking about
2 here is -- is electron equilibrium.

3 **MR. HINNEFELD:** Uh-huh.

4 **DR. BEHLING:** Okay. Electron equilibrium, and
5 it's -- rapidly rises and it's based on the mean
6 free path of an electron that you generate. And
7 for 30 to 250 keV, you're talking about an
8 electron mean free path length that is microns.
9 It's very short. And so you would have a rapid
10 build-up, which at the point of 7 millirem
11 probably has reached electron equilibrium.

12 **MR. HINNEFELD:** If that's the case, then there is
13 none. I think this came out of the standard
14 reference --

15 **DR. BEHLING:** Yeah.

16 **MR. HINNEFELD:** -- and I have to go find --

17 **DR. BEHLING:** I suspect all these DCFs are in
18 error. For one, you know, I have a difficult in
19 understanding why AP and PA are identical. In
20 fact, you can see the same thing happened -- if
21 you look at an eye dose -- one could certainly
22 argue the point in saying well, maybe these take
23 an average value since obviously skin is on the
24 anterior side and the posterior side and
25 everywhere in between. On the other hand, if you

1 look at for instance the eye dose or thyroid dose
2 and -- and you look at the DCF value depending on
3 AP and PA geometry, you know, realizing that the
4 eyes are the exit side for photons that are
5 coming from the posterior and the same thing with
6 the thyroid, and so you have to look at those
7 numbers and say these things don't make sense.

8 **MR. HINNEFELD:** Okay.

9 **DR. BEHLING:** And -- and for some reason or
10 another ICRP must have assumed that you're
11 wearing dosimeters front and back.

12 **MR. HINNEFELD:** Okay. Let -- let -- we'll have
13 to look into the whole appendix B --

14 **DR. BEHLING:** Yeah.

15 **MR. HINNEFELD:** -- thing then. I mean that's
16 kind of a procedure of your task, sort of --
17 finding. I mean rather than being specific to
18 this dose reconstruction, it would be kind of
19 part of your task -- which task is that?

20 **MS. BEHLING:** Three.

21 **MR. HINNEFELD:** Three.

22 **DR. BEHLING:** Yeah. I mean I can clearly look at
23 the less than 30 keV and say the DCF -- it
24 doesn't matter whether it's AP or PA -- is 1.8
25 versus -- you know, they're essentially the same.

1 And there has to be something wrong here with --

2 **MR. HINNEFELD:** Yeah. That has to presume that
3 the dosimeter is facing the beams.

4 **DR. BEHLING:** Yes. I think they make some
5 generic assumptions in ICRP that invalidates the
6 fact that people monitored always wore their TLD
7 up front.

8 **MR. HINNEFELD:** Yeah.

9 **DR. BEHLING:** Okay. And that is the dose of
10 record, and you're trying to convert that HP-10
11 dose into a deep dose. And so for instance, I
12 would say this. How could you have anything less
13 than unity if for instance you're measuring let's
14 say a dose to the lung and it's a PA geometry.
15 What you're measuring is an exit dose. This TLD
16 -- this is my TLD and the source is behind me.
17 You're measuring an exit dose which means that
18 the tissue that precedes this, my lungs or
19 anything else, is getting more than what the exit
20 dose is that my TLD is receiving.

21 **MR. HINNEFELD:** Right.

22 **DR. BEHLING:** So by -- by simple first
23 principles, you can conclude that these DCFs are
24 wrong. They should always be higher than unity,
25 especially for PA geometry.

1 **MR. HINNEFELD:** For PA geometry.

2 **DR. BEHLING:** Yeah. And -- and don't forget,
3 these TLDs and films, they actually even had not
4 -- it's not even an exit dose. They had 1000
5 millirem filter on the back side.

6 **MR. HINNEFELD:** Yeah, back side too. Yeah.

7 **DR. BEHLING:** So -- so you can look at these and
8 conclude that the DCFs are based on something
9 that is -- doesn't apply to the world of
10 individual personal monitoring and what the dose
11 of record really would suggest.

12 **MR. HINNEFELD:** Okay. Well, certainly something
13 we need to carry into our --

14 **DR. BEHLING:** And I pointed that out under Task
15 3.

16 **MR. HINNEFELD:** It's in Task 3, yeah.

17 **DR. BEHLING:** I've looked at the DCFs and said
18 there's something wrong here with the
19 assumptions. The DCFs do not -- do not comply
20 with what you understand based on -- on the
21 dosimeter position and the monitoring practices.

22 **MR. HINNEFELD:** All right. Well, let's break
23 real quick since lunch is here.

24 **DR. ROESSLER:** Can I ask a question on this case
25 before we -- two questions actually, and they're

1 kind of general, not so much specific to the
2 conversation today. But Hans and Kathy, on this
3 particular case -- it seems like one of the more
4 complicated ones.

5 **DR. BEHLING:** Yes.

6 **DR. ROESSLER:** And I'm wondering what input you
7 got when you did the conference call. You had
8 Henry Anderson and Bob Presley involved.

9 **DR. BEHLING:** Yes.

10 **DR. ROESSLER:** Now Henry, being a physician, I
11 would think would have maybe some input on the
12 basal cell cancer situation. Did you get much
13 feedback --

14 **DR. BEHLING:** No.

15 **DR. ROESSLER:** -- from them?

16 **DR. BEHLING:** No, not really. And I fully
17 understand he's a physician but this is really a
18 dosimetry issue.

19 **DR. ROESSLER:** What you're bringing up is
20 dosimetry. What I want to bring up is more of a
21 clinical thing, and this I'll mention to Stu.
22 Every time I look at one of these basal cell
23 cancers, I keep thinking of suntanning, fishing
24 and stuff. When -- and in the lung cancers,
25 there's a provision for taking into consideration

1 smoking.

2 **MR. HINNEFELD:** Uh-huh.

3 **DR. ROESSLER:** That's not true, I would say, on
4 the basal cell cancers.

5 **MR. HINNEFELD:** Right.

6 **DR. ROESSLER:** There's nothing.

7 **MR. HINNEFELD:** There is no other lifestyle --

8 **DR. ROESSLER:** You just assume --

9 **MR. HINNEFELD:** -- adjustment made in IREP.

10 **DR. BEHLING:** And clearly, I mean I come from --

11 our current location is North Carolina and we
12 have farmers. And whenever I go to my barber

13 shop I deal with the locals sitting in the barber
14 shop and listening to conversations. I'm

15 awaiting my -- my hair -- my turn for a haircut,

16 and the subject invariably turns to old people

17 and their health problems. And I can't tell you

18 how many people complain about oh, he was

19 diagnosed with melanoma. He died from melanoma.

20 And these farmers, they all get cancer because

21 they spend their whole lifetime outside in -- in
22 the environment.

23 **DR. ROESSLER:** Or people who fish a lot.

24 **DR. BEHLING:** And of course, you know, the POC

25 has to obviously be driven by baseline cancers as

1 a competing variable. In other words what is it.
2 Is it more likely to be radiation as opposed to
3 all other factors, including sunlight. And so --

4 **DR. ROESSLER:** Uh-huh, but that's not taken into
5 consideration.

6 **DR. BEHLING:** And so it's not likely to be taken
7 into consideration.

8 **DR. ROESSLER:** Okay. Those are my questions.

9 **DR. BEHLING:** I mean skin cancers are so
10 prevalent in the South.

11 (Whereupon, a recess was taken from 12:35
12 p.m. to 1:15 p.m.)

13 (Whereupon, Dr. Makhijani was unavailable for the
14 remainder of the day.)

15 **DR. BEHLING:** We're back to the -- with tab 28,
16 and I'm just briefly going over it. As I said,
17 there's so -- this is so complex and we can't
18 really deal with all of the issues. But with
19 regard to missed external electron and photon
20 doses, I just did a couple calculations, and they
21 are on page 19 where you see, for instance, my
22 estimates there. And I calculated the doses for
23 two years, for 1979 and for 1990, and I came up
24 with for -- for 1979, a dose of 90 millirem and
25 for 1990, 30 millirem. And when you compare that

1 to those in the table below, you realize I'm
2 considerably lower than what the assigned dose
3 is. So again, the errors here, if there are any
4 -- and I'm not saying there are because of the
5 workbooks -- they would probably, at least based
6 on my preliminary investigation, be on -- on the
7 side of the claimant, being higher than I would
8 have calculated them manually.

9 And as I said, I think what we can do is, if you
10 show us a workbook maybe we'll run one of these
11 two cases just to see what we come up. And if in
12 the process we realize what he did is in
13 compliance with the workbook and the workbooks
14 are compliant, then these -- these two cases in
15 particular, the Savannah River cases, will all be
16 modified to reflect our new understanding of what
17 the workbooks really have you do and how these
18 doses are calculated.

19 I think with regard to on-site ambient dose,
20 which starts on page 20, again, we end up with a
21 similar situation that we talked about in the
22 previous case where there are so many options for
23 you to choose from and -- and TBD 3, which is the
24 Savannah River TBD, I have option 1, 2, 3, and 4,
25 and I followed their procedure and then compared

1 it with NIOSH dose reconstruction. Again, that's
2 on -- in Table 3 on page 22. And you see they're
3 all very close, depending on which option. I
4 have 65 millirem, 52, another one is 52, and 45
5 and so forth. And of course, the NIOSH report
6 was 43. But none of them match exactly, but
7 they're all obviously very close and I still
8 question whether or not all these different
9 options that are available are really worth the
10 time to pursue based on these trivial
11 differences.

12 Going on to occupational medical exposure,
13 nothing on this exactly match those numbers. On
14 page 23 we talk about audit of internal doses,
15 and again we talk about here the two issues that
16 are really task 1 issues, and that's the issue of
17 organifield tritium versus ICRP 30 and 68. And
18 we've already discussed those issues and stated
19 that they -- they really belong under task 1.
20 So there were quite a few things that -- that we
21 could have spent probably hours on discussing
22 that I would just as soon defer to looking at a
23 workbook and -- and maybe we can clear these two
24 -- two dose reconstructions up once
25 (unintelligible) --

1 **MR. HINNEFELD:** We could conceivably get an
2 opportunity on Friday after you've gone -- you
3 know, to chat one last time and see how we feel
4 like we're standing on these, or we could do it
5 on the phone after this week, as well, so...

6 **DR. BEHLING:** Yeah. As I said, most of the
7 things -- as you see, they're not just one
8 finding, two findings. There are a whole bunch
9 and it's all because they're locked into each
10 other.

11 **MR. HINNEFELD:** Right.

12 **DR. BEHLING:** And once we solve one, this domino
13 effect falls by the wayside.

14 **MR. HINNEFELD:** Right.

15 **MS. BEHLING:** But just as a -- as a technical and
16 as a side issue, I think the way we're going to
17 handle the reports from here on in -- and Mark,
18 you can correct me if I'm wrong -- but when we do
19 have a finding, because this is now going to be a
20 trackable issue and something that we're going to
21 -- we're tracking through our checklist and
22 tracking through the matrix, when we go back to
23 revise the -- our write-up, we'll put there in an
24 issue, this was resolved. It won't -- it's not
25 like the finding will go away. It will just be -

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MR. GRIFFON: Don't just delete it. Yeah.

MS. BEHLING: -- a resolved issue. Exactly. So we can follow the -- the sequence of events.

MR. GRIFFON: We worked with NIOSH on workbook analysis and --

MS. BEHLING: Exactly.

MR. GRIFFON: -- this issue is resolved.

MS. BEHLING: Exactly.

DR. BEHLING: Okay. The next case is case 10,732 which is also a Savannah River Site case. For quick review, this individual worked from September 1984 to May of '93, so a period of about ten years. But it was not continuous employment; in fact right below on page 4, you see the periods of employment. So there were a total of six discrete employment periods over that ten-year time frame. In fact when you add those time frames up, instead of ten years they only correspond to about 21 months in total of employment.

This individual was an iron worker and he died of lung cancer in -- no, he was diagnosed with lung cancer in 2002. I'm not sure if he's a survivor. I should look at the CATI report to see if he was

1 the one giving the interview. This person was
2 monitored on a monthly basis for external
3 exposure. There were in his file a number of
4 bioassays, in vitro bioassays, urinalysis for
5 tritium, strontium, fission products, plutonium,
6 as well as he had some whole-body counts. Based
7 on the assigned dose of 16 rem, this individual
8 was given a POC of just under 19 percent for his
9 lung cancer.

10 Page 5 of the report is Table 1, which gives you
11 a quick summary. Again, recorded photon dose was
12 very nominal. He had around -- a recorded dose
13 of 282 millirem as a recorded photon dose. He
14 had occupational medical exposure that was very
15 comparable, 279 millirem, and assignment of
16 external environmental dose of 545. But the
17 single largest exposure to the 16 rem whole-body
18 dose -- or organ dose assigned to him comes from
19 hypothetical exposures from tritium, alpha, and
20 electron, as you see in the bottom. So if you
21 add those up, it's about 14.7 rem for -- for
22 assigned internal dose, which is the overwhelming
23 component of the total assigned dose of 16. So
24 he had very little external, and most of his
25 assigned dose was really internal.

1 Table 2 on page 7 has some of the things that we
2 identified as findings. In total there were five
3 findings. Again, they're all very low impact and
4 affect the doses only in a very marginal sense.
5 And let me just briefly go over those.

6 The first finding is on page 9, which is finding
7 number 29.1-C.4.1, failed to include recorded
8 photon dose uncertainty. We've already discussed
9 that this morning, and again, it's a decision on
10 the part of the dose reconstructor saying I don't
11 know how to this probably, or it's not worth the
12 time. And again, like I said, it would have
13 probably been a very trivial amount given the
14 fact that the recorded photon dose was less than
15 300 millirem. So any uncertainty associated with
16 that, would have been trivial. And again, in
17 context of the overall assigned dose of 16, which
18 would have probably contributed very little to
19 that since most of that 16 rem dose was due to
20 hypothetical internalized exposures assigned to
21 them.

22 The next finding is on page 10. It's finding
23 29.2-C.2.3, incorrect occupational medical dose.
24 Again, the doses here are very marginal. I was
25 not able to produce the assigned medical dose,

1 but these values are just slightly different from
2 the ones that were assigned. In other words,
3 this -- this time around we would have added 157
4 millirem to his dose had he assigned the doses
5 that I think he should have, based on the lung
6 dose and values identified in TIB-6.

7 **MR. HINNEFELD:** Were there other numbers in the
8 Savannah River Technical Basis Document,
9 different numbers? Or did you -- do you recall -
10 -

11 **DR. BEHLING:** I -- I -- he references TIB-6.

12 **MR. HINNEFELD:** TIB-6.

13 **DR. BEHLING:** And -- and so I used that. I can't
14 tell you, Stu, whether or not if the, you know,
15 the section on the TBD for Savannah River would
16 have given -- I'm not sure whether they used
17 group 1, 2, 3 categories in the --

18 **MR. HINNEFELD:** Savannah, I think they have the
19 option to do that. I'm not sure.

20 **DR. BEHLING:** Yeah. I -- I can't tell you, but
21 if I recall the dose reconstruction --

22 **MR. HINNEFELD:** But he referenced TIB-6.

23 **DR. BEHLING:** Referenced TIB-6. So, you know,
24 they always reference Table 4.0-1 and then you
25 have the option of tracking the time periods in

1 question and you take the organ dose. Based on
2 that, I would have assigned 157 millirem in
3 addition to the ones he did assign.

4 **MR. HINNEFELD:** Okay.

5 **DR. BEHLING:** Oh, I -- I believe -- yeah, he used
6 a gender factor, as I did in the next one, error
7 in converting occupational medical dose to organ
8 dose. It appears that the error involves the use
9 of a lung dose for a specific gender when in fact
10 the claimant is of the opposite gender. I try
11 not to use -- unless of course it's prostate
12 cancer, I try not to identify the person's
13 gender. But, you know, when you have breast
14 cancer or prostate cancer you usually have to
15 obviously acknowledge the fact that we know what
16 the gender is (unintelligible) --

17 **DR. ROESSLER:** I have a comment on that one.

18 **DR. BEHLING:** Yes.

19 **DR. ROESSLER:** And without specifying the gender,
20 it seems like this particular -- this is an
21 example that fits in that same case of when you
22 use the efficiency process and trying to be
23 claimant-friendly that there's some things that
24 you should really use the realistic situation,
25 like the 12 radionuclides instead of 28 is one.

1 Here's another one. If the gender is a certain
2 gender, and you use the opposite gender because
3 it's more claimant-friendly, that doesn't make
4 sense. This is kind of a trivial one but I think
5 it fits in that same category of -- of, you know,
6 in the future it should be claimant-friendly but
7 not beyond the bounds of being ridiculous.

8 **MS. BEHLING:** Yeah.

9 **DR. ROESSLER:** And this -- this is one -- one
10 case of it I think.

11 **MS. BEHLING:** Good scientific -- yeah,
12 scientifically sound.

13 **DR. ROESSLER:** Use the reality --

14 **MS. BEHLING:** Yes.

15 **DR. ROESSLER:** -- when it -- when it's there.

16 **DR. BEHLING:** There were a number of findings
17 involving environmental external dose. Again, if
18 you look at the actual tables that are defined in
19 the TBD for the H-Area, that's Table C-13, they
20 end up with a number that I couldn't match.

21 Yeah, in this case they failed to include the on-
22 site ambient dose uncertainty which is contained
23 in that table -- and the issue of argon 41 as a
24 potential contributor. But like I said, these
25 are likely to have added very few -- few amounts

1 of additional exposure, either the uncertainty or
2 the inclusion of argon 41. And again, based on
3 the fact that the internal exposures were fairly
4 high and probably well in excess of what he --
5 what the individual really experienced, in -- all
6 in all it would not have made a significant
7 difference to dose to have included uncertainty
8 and the contribution of argon 41 as part of on-
9 site ambient.

10 Again, very trivial issues here, the missed dose
11 from tritium here for entry number 40. I have to
12 tell you, I have to re-read some of it myself
13 because I can't commit everything to memory.

14 **MR. GRIFFON:** I don't see anything about missed
15 dose from tritium in your --

16 **DR. ROESSLER:** Page 14.

17 **MR. GRIFFON:** -- matrix, on your matrix. I'm
18 looking on the matrix.

19 **MS. BEHLING:** Yeah. I'm looking at that myself.

20 **MR.**

21 **GRIFFON:** I'm trying to make -- oh, no. This --
22 this -- I don't know if you have this, Gen.

23 **DR. ROESSLER:** Oh, no. I don't have that. I
24 have just this one.

25 **MS. BEHLING:** I e-mailed it.

1 **MR. GRIFFON:** Oh, it's -- you got it on e-mail,
2 but you don't -- yeah.

3 **DR. BEHLING:** We're talking here 3 millirem.

4 **MR. ALLEN:** Yeah, that missed dose anyway was --
5 the assumption in this one was 71 -- 92, probably
6 7 millirem per year. That's right about the
7 cutoff point. It was either 71 or --

8 **DR. BEHLING:** It's five -- five -- yeah, may have
9 been.

10 **MR. ALLEN:** Basically the assumption of missed
11 dose ends up giving you a higher -- I believe a
12 higher urinalysis than what this guy had, so it's
13 why it was ignored.

14 **MS. BEHLING:** And I guess the reason I didn't
15 include it in the matrix is because we made a
16 statement here that this dose is trivial and can
17 be ignored and so I didn't make a finding out of
18 it.

19 **MR. GRIFFON:** So it's more of an observation.

20 **MS. BEHLING:** Yes.

21 **DR. BEHLING:** Yeah. I just make a statement. We
22 state here, however, this dose is trivial and may
23 be ignored. I mean I don't think I would trip
24 over 3 millirem if someone chose to ignore it.

25 **MR. ALLEN:** Yeah. I was trying to say instead of

1 being missed, it was just overestimated.

2 **DR. BEHLING:** And I think both the -- yeah.

3 There were no findings for issues involving the
4 CATI; radiological incidents, none. Okay. So I
5 -- as I said on page 6, most of the findings had
6 very little impact on dose and I would say, given
7 some of the differences being either in favor --
8 more in favor than not, there was no significant
9 impact on -- on changing dose or probability of
10 causation.

11 **MS. BEHLING:** One more here, Hanford.

12 **DR. BEHLING:** One more here.

13 **MS. BEHLING:** Take them through.

14 **DR. BEHLING:** Okay. The next one is tab 30, and
15 this involves a claim from Hanford. The number -
16 - claim number is 1157. And this individual
17 worked at the Hanford facility from 1967 to the
18 present. The cancer was embryonal carcinoma of
19 the right testis diagnosed in 1977, so obviously
20 this individual was a male. He was employed at
21 three different periods of time, and he -- his
22 dose reconstruction was fragmented through three
23 different areas. He was a chemical technologist
24 for most of that time frame, engineer/chemical
25 technologist. He stated that he was involved in

1 a number of radiological incidents that involved
2 spills and other things. Individual was
3 monitored monthly and -- for a period of time,
4 but in portions of his employment he was
5 monitored quarterly. So again, he has a fairly
6 complex dose reconstruction based on the
7 different jobs, locations, and monitoring
8 periods.

9 If you look at Table 1 on page 5, again you get
10 an overview of what his exposures were based on
11 the type of exposure. He had about 8.8 rem of
12 photon dosimeter dose. He also had nearly 1.4
13 rem of neutron dose and he again was given the
14 largest contribution of dose from an internal
15 dose based on hypothetical radionuclide intake.
16 So in total his exposure was 35.46 rem to the
17 testes.

18 Table 2, which is our case review checklist
19 identifies a total of 11 findings which we'll try
20 to briefly go through.

21 **MS. BEHLING:** (Unintelligible)

22 **DR. BEHLING:** Yeah. I'm trying to remember
23 exactly what -- what he had done here. He -- he
24 fractionated the photon exposures by 25 percent
25 being less than 30 keV, 75 percent between 30 and

1 250, and then we had to go through an awful lot
2 to find out what -- those conversion factors were
3 also energy dependent, as you see in Table 3 on
4 page 9. And they varied. As I said, the
5 fractions varied over time period. So you see in
6 the first period, '67 through '71, in 1975 he
7 used zero per fraction for 30, 50 percent, 30 to
8 250, and 50 percent greater than 250. And for
9 subsequent time periods, that changed from -- to
10 -- to some contribution from lower energy photons
11 between '72 and '74, and so forth. So it was one
12 of those things where you had to really look hard
13 to figure out which years and which energies and
14 which DCFs were being used.

15 **MS. BEHLING:** That all came from the Technical
16 Basis Document --

17 **DR. BEHLING:** Yes.

18 **MS. BEHLING:** -- from the Hanford Technical Basis
19 Document. But in any case he didn't use them
20 appropriately.

21 **DR. BEHLING:** Yeah. I'm trying to remember what
22 he -- yeah, I couldn't figure out on what the --
23 the -- what was the basis for selecting these
24 photon energy distributions, the 25 and 50 and 75
25 (unintelligible). I did not verify the -- the

1 basis for it, at least according to the Hanford
2 Technical Basis Document. I could not verify
3 where those fractions came from, and I explain
4 that on page 10.

5 **MS. BEHLING:** We were able to reproduce what he
6 did, but it does not match what the TBD
7 recommends you -- that he does for those
8 fractions, energy distributions.

9 **DR. BEHLING:** Yeah, and again I don't -- I'm not
10 convinced that all of the effort is really
11 something that complies with efficiency,
12 balancing efficiency with precision. Seems like
13 we're splitting hair here in some of these
14 instances and we do often question whether or not
15 the assigned fractions are even representative of
16 the facility to begin with. But it seems like we
17 spend an awful lot of time here going through
18 these various time-consuming and laborious
19 approaches for assigning IREP. And as I said, I
20 would like still to determine whether or not
21 IREP's assessment of relative effectiveness
22 factors that are driven by these different photon
23 energies are in fact something that has any level
24 of credibility that would warrant this level of
25 effort. After all, a dose is a dose until you

1 know that a dose is not a dose based on a
2 relative effectiveness factor. And I realized in
3 looking at some of these, they spend an awful lot
4 of time going through these (unintelligible)
5 because then it not only applies to recorded
6 photon dose, but it also applies to missed photon
7 dose. And you go through all these different
8 iterations just to accommodate IREP.

9 **MS. BEHLING:** Well, the other thing --

10 **MR. GRIFFON:** Well, when it's in a workbook, it's
11 a little faster.

12 **DR. BEHLING:** Yeah, if it's in a workbook --

13 **MS. BEHLING:** Although in this particular case,
14 he did not use a workbook and this, I believe, he
15 --

16 **MR. GRIFFON:** Oh, he didn't?

17 **MS. BEHLING:** No, he is a best estimate because
18 he was at a little over 40 percent POC with this
19 dose reconstruction. So the reconstructor spent,
20 you know, a fair amount of time -- we always say
21 sharpening his pencil -- on this one, because it
22 was -- the POC was over 40 percent.

23 **MR. GRIFFON:** Well, it wasn't a best estimate
24 though, was it? Because the internal dose is
25 still a hypothetical.

1 **DR. BEHLING:** Yes. Well, now this is what I
2 said. Sometimes they go through all these very
3 definitive things for -- for making precise
4 estimates of recorded or even missed, and then
5 they just say well, we'll give you 20
6 radionuclides on the first day and all of that
7 attempt to be precise is lost and somewhat
8 inconsistent.

9 **MR. HINNEFELD:** Well, probably what happens is
10 the dose reconstructor tries it as an
11 overestimating approach because it's testicular
12 cancer. It's not particularly radiogenic. And
13 so he does several overestimating steps and he
14 came out over 45 percent or around 50 percent or
15 something and says, okay, well, I can't turn in
16 an overestimate in this range. So now, what can
17 I do to fine tune this.

18 **MS. BEHLING:** Exactly.

19 **MR. HINNEFELD:** It's easier to fine tune the
20 external stuff than for -- for -- depending on
21 who the dose reconstructor is, it's easier to
22 fine tune the external stuff than it is to fit an
23 IMBA curve to bioassay data. And so they start -
24 - you know, they start doing more and more
25 definitive things on the external and then leave

1 the internal at the overestimating. I suspect
2 that's how it got to be where we were.

3 **DR. BEHLING:** Yeah, as I said I think --

4 **MR. ALLEN:** I think (unintelligible) did use a
5 workbook on this one.

6 **MR. HINNEFELD:** They do have a workbook. They
7 just did it under Monte Carlo where it goes back
8 and forth between normal and lognormal, or what?

9 **MR. ALLEN:** I think they -- they probably used a
10 workbook and clicked off a couple of maximizing
11 and then tweaked on that.

12 **MR. GRIFFON:** I saw the workbook in the files.

13 **MS. BEHLING:** Oh, is that right?

14 **MR. GRIFFON:** Yeah, yeah.

15 **MS. BEHLING:** So they did work use a workbook on
16 this?

17 **MR. GRIFFON:** Yeah. I don't know if they Monte
18 Carlo'd it but --

19 **MR. HINNEFELD:** Not Monte Carlo --

20 **MR. GRIFFON:** They used the workbook, right.

21 **DR. ROESSLER:** Is that really Table -- in the
22 middle of that first paragraph, it says Table 6E
23 -2. That's a very strange table number. This is
24 on page --

25 **MR. GRIFFON:** 6E-2.

1 **MS. BEHLING:** Yeah, it's --

2 **DR. BEHLING:** It's part of the attachment E.

3 **DR. ROESSLER:** It is? It sounds like a number
4 with a superscript or something. That is a real
5 number?

6 **MR. HINNEFELD:** You've got to get a microscope
7 out to read it though. That one's really hard to
8 read.

9 **MR. GRIFFON:** Table 20 is --

10 **DR. BEHLING:** No, it's in reference to Attachment
11 E.

12 **MS. BEHLING:** That's right. They force you to
13 read lots and lots of pages in that site profile
14 and then at the attachment at the end they give
15 you all --

16 **MR. HINNEFELD:** Here's what you do --

17 **DR. ROESSLER:** I tried looking at one of these
18 backup disks that they send you, the Privacy Act
19 stuff -- which you can't let anybody else see and
20 all that -- before our teleconference call. And
21 then looking at the case and looking at the disk,
22 I said thank God we have a contractor because
23 those of us who are on the Board have jobs.
24 There's no way that we could put in the detailed
25 time that these people are doing. I mean this is

1 an absolute necessity. Not only the time, but
2 the knowledge, too.

3 **DR. BEHLING:** As I said, I couldn't convince
4 myself that what was done was really claimant-
5 favorable/unclaimant-favorable but, you know, and
6 -- and I state there on page 10 where I talk
7 about what they did. And in the end I sort of
8 conclude that, given the varying locations and
9 energy distribution, it may have been more
10 efficient to assume a hundred percent of 30 to
11 250 keV and a dose conversion factor of 1.011 for
12 all recorded -- I mean to me, I would have like
13 to have actually had the time to run all the
14 variables. And so I say what is the final
15 difference. Are we talking about a few millirem
16 here? All that effort with all the energies and
17 fractions and so forth, again, I don't want to
18 beat a dead horse, but efficiency has to be
19 viewed as part of the equation for saying is this
20 really worth our time, especially when we then
21 turn around and assign the biggest dose to a
22 hypothetical situation that we can't verify one
23 way or the other in terms of its authenticity or
24 how accurate. It really doesn't represent the
25 true internal dose. And so it's just, you know,

1 my feeling that perhaps for -- for efficiency's
2 sake, let's default to a value that is -- is easy
3 to deal with, understandable to the claimant who
4 may have to review his report, and in the end
5 take some of the hours of work out of the
6 equation.

7 The next issue is the missed photon dose, and I
8 guess what I state here is that we --

9 **MS. BEHLING:** Uncertainty.

10 **DR. BEHLING:** Yeah, we again missed the
11 uncertainty here. He -- he talks in one place --
12 and maybe this is something that -- Kathy has
13 made mention of this before. I think the report
14 oftentimes reflects a boilerplate wording that is
15 taken out and it does not represent ultimately
16 what the actual IREP input statement would have
17 you believe. For instance, on page 10 I state
18 that for missed photon dose, the DR report
19 identified total 15 missed dosimeter readings
20 using LOD values cited in Table 6E-6, and then
21 states the following: A maximum potential missed
22 dose of 0.463 rem from photons was used as the
23 95th percentile of a lognormal distribution for
24 the purpose of calculating probability of
25 causation. Well, if you look at the actual

1 values, they use not the LOD but they use LOD
2 over 2 and a geometric standard deviation. So
3 what you have -- and then that's okay, too, but
4 you shouldn't state one thing in the text of the
5 report and then do something totally different in
6 the IREP input. And it appears that boilerplate
7 wording is taken out -- and again, I understand
8 why you want to standardize the format of the
9 report, make it as -- as simple as possible, but
10 as a minimum he could have done either LOD or LOD
11 over 2, but they should be consistent. You
12 shouldn't state that you're going to say -- you
13 give them the 95th percentile value, but then
14 actually when you look at the IREP input values
15 that they are in fact LOD over 2 with a geometric
16 standard deviation.

17 **MR. HINNEFELD:** Well, it was the -- I mean the
18 463 is the 95th percentile of that -- of that
19 lognormal distribution that's used in the IREP.

20 **DR. BEHLING:** Yes.

21 **MR. HINNEFELD:** It used 230 and a GSD of 1.52,
22 that means 463 is the 95th percentile. So the
23 explanation -- the dose reconstruction
24 explanation is not intuitively obvious, or it's
25 not obvious --

1 **MS. BEHLING:** That's right.

2 **MR. HINNEFELD:** -- to the reader why that says
3 463 and the IREP line says 230. That's true.

4 **MR. GRIFFON:** Have you gone past the missed dose
5 yet, Hans?

6 **DR. BEHLING:** Pardon?

7 **MR. GRIFFON:** Missed photon dose, are you done
8 with that one?

9 **DR. BEHLING:** Yeah, missed photon dose. Those
10 are multiple findings here. Failed to account
11 for all missed photon doses -- (unintelligible) -
12 - yeah, in some instances zero doses are not the
13 only time when you should use missed dose,
14 because obviously if you're going to maximize a -
15 - an exposure, then it is LOD. Any value
16 recorded dose that's less than LOD should be
17 considered as a surrogate for a missed dose
18 because obviously -- let's assume the LOD value
19 for a dosimeter is 40 millirem and the recorded
20 dose is 25. You would -- if you want to maximum
21 his missed dose, you would assign 40 millirem as
22 opposed to -- to the 25 that is really the
23 recorded dose. So missed dose has to be viewed,
24 not just for zero recorded doses, but any value
25 that's either LOD, if you're maximizing, or LOD

1 over 2. And I think that everyone understands
2 that equation.

3 **MR. HINNEFELD:** Yeah, yeah. I was just going to
4 say, certainly if you have a recorded value
5 that's less than LOD over 2 --

6 **DR. BEHLING:** Yes.

7 **MR. HINNEFELD:** -- we would say that should be a
8 zero.

9 **DR. BEHLING:** Yes, yes.

10 **MR. HINNEFELD:** That would be treated as a zero.

11 **DR. BEHLING:** And I think in the last 20 cases I
12 identified cases where the recorded dose was 1 or
13 2 millirem.

14 **MR. HINNEFELD:** Right.

15 **DR. BEHLING:** And -- and of course the guy would
16 have been better off if we would have had zero
17 because he would have -- as a minimum have gotten
18 LOD over 2 as opposed to one or two recorded
19 doses. So that's that issue.

20 **MS. BEHLING:** And I believe during the previous
21 cases we addressed this, and this was something
22 that you were going to be making changes to. Is
23 that correct?

24 **MR. HINNEFELD:** Yeah. We've already -- we've
25 told the contractor that if they have a recorded

1 dose that's less than LOD over 2, then that's
2 treated as a zero.

3 **DR. BEHLING:** Yeah. I think, as I state here,
4 count 16 zero readings along with 12 positive
5 readings below LOD. And so again, if -- if you
6 want to be claimant-favorable you would assign a
7 missed dose even though there was a positive but
8 it was below LOD.

9 **MR. HINNEFELD:** Well, I guess LOD -- or LOD
10 depends on how the LOD is valid.

11 **DR. BEHLING:** Yeah.

12 **MR. HINNEFELD:** How do you know -- what do you
13 know because LOD -- if it's a Currie MDA, meaning
14 that you're confident you're going to see that
15 value -- and the halfway too, that would be what
16 Currie calls the critical line, and then we would
17 use the critical (unintelligible) LOD because
18 that's really where you say you can't tell if
19 you're different from zero is LOD over 2. So if
20 you can't tell that you're different than zero,
21 recorded count is a zero, including the missed
22 dose calculation. That's -- that's our approach.

23 **DR. BEHLING:** The next one, recorded neutron
24 doses, and there were a couple findings here that
25 I identified on page 12. He -- he said he gave

1 neutron doses on the basis of energy between 100
2 keV and 2 MeV and between 2 and 20 MeV, and what
3 it turns out, that he did not -- he states that
4 these were the fractions, but when you -- when
5 you actually calculate it, it appears that what
6 he's done is to use 100 percent for each. The
7 doses for the 100 keV to 2 MeV would have been 10
8 percent too high based on the 90 percent and 10
9 percent, and of course the 2 to 20 MeV would have
10 been ten times too high because they should have
11 only been 10 percent fraction. So in essence he
12 overestimated by -- he -- by stating in the text
13 that he was going to do it but then failing to
14 apply those fractions in this calculation.

15 Missed neutron doses. Okay. I identified
16 several deficiencies -- three deficiencies for
17 missed photon doses. Let's see here. The first
18 one is failure to properly account for missed
19 neutron dose. SC&A was not able to duplicate the
20 42 zero readings reported by NIOSH but did count
21 90 zeroes neutron dosimeter readings and 21
22 neutron readings below LOD over a 10-year period.

23 **MS. BEHLING:** In going into the records, we -- we
24 found almost double of the --

25 **DR. BEHLING:** Yeah. He --

1 **MS. BEHLING:** -- of the zero --

2 **DR. BEHLING:** -- understated the number of missed
3 neutron doses. Incorrect energy percentages --
4 yeah, again, the same mistake here. He said he
5 would give it a 10 percent and 90 percent
6 fraction for the two ranges, but he ended up
7 doing the same mistake as he did for actual
8 recorded neutron doses.

9 **MS. BEHLING:** Excuse me one second. Can this be
10 an item? This is an item that NIOSH can look
11 into, the dose --

12 **MR. HINNEFELD:** Well, I certainly want -- I want
13 to certainly look into the number of missed doses
14 and the number of zeroes, the number of zeroes in
15 the missed dose calculation. This table that he
16 -- that's here in section 2.3 on page 12, is this
17 out of the dose reconstruction report?

18 **MS. BEHLING:** Yes. Yes, it is.

19 **DR. BEHLING:** Yes.

20 **MR. HINNEFELD:** Hasn't he combined the 90 percent
21 and 10 percent with the ICRP 60 factor in that
22 table? Is that how he got these numbers?
23 Because the number I'm familiar with, I mean .1
24 to 2 -- the ICRP conversion is 1.91, right?

25 **MS. BEHLING:** Yes.

1 **MR. HINNEFELD:** Isn't that the energy range you
2 use --

3 **DR. BEHLING:** You may be correct --

4 **MR. HINNEFELD:** If you take 90 percent of that --

5 **DR. BEHLING:** ICRP 60 may have taken that into
6 consideration.

7 **MS. BEHLING:** Maybe that's what they did then.

8 **MR. HINNEFELD:** I think they took the 90 percent
9 and the 10 percent in those ICRP factors, because
10 an ICRP factor of .13 just looks too low to me on
11 2 to 20. And so I think that must incorporate
12 that 10 percent fraction that goes in that energy
13 range. I think those factors that they call ICRP
14 factor are actually a combination of the
15 apportioning --

16 **DR. BEHLING:** I have to look at that, but 10
17 percent wouldn't give you .13. It would give you
18 .19.

19 **MR. HINNEFELD:** But those -- but the ICRP factor
20 is different on different energy ranges. You see
21 1.91 most often because .1 to 2 is used most
22 often because of the REF and it's most favorable.
23 So you see 1.91 most often, but the different
24 energy bands for neutrons have different ICRP
25 factors.

1 DR. BEHLING: I'd have to look at that.

2 MS. BEHLING: Let's all look at that.

3 DR. BEHLING: You may be right.

4 MS. BEHLING: Because I thought we assumed that's
5 what he did, also. I don't know.

6 DR. BEHLING: I have to look at that to see if
7 that -- if that actually addresses that as
8 (unintelligible).

9 MR. HINNEFELD: I think that's what's going on in
10 that table.

11 MS. BEHLING: Possibly.

12 MR. HINNEFELD: And I really hated that table
13 when I saw it in the dose reconstruction --

14 DR. BEHLING: Yeah, if you have --

15 MR. HINNEFELD: -- and I told them for --

16 DR. BEHLING: Yeah, let's -- let's make an issue
17 of that.

18 MR. HINNEFELD: -- explain to me what you're
19 doing here, you know --

20 MS. BEHLING: Yes.

21 MR. HINNEFELD: -- instead of mixing stuff up
22 like that.

23 MS. BEHLING: Yeah.

24 DR. BEHLING: Table 6E-3 is the table that we
25 need to look at.

1 **MS. BEHLING:** We'll look at that again, but I can
2 assure you when -- when we can't reproduce
3 something, before we will say we can't do that,
4 we go through hoops --

5 **MR. HINNEFELD:** A lot of different tries --

6 **MS. BEHLING:** So we tried --

7 **MR. HINNEFELD:** You have convinced me of that.
8 Trust me, you have convinced me of that.

9 **MS. BEHLING:** Because we don't want to
10 erroneously, you know, keep it. But -- but you
11 may be right on this one. I'll look. But with
12 regard to the missed neutron dose --

13 **MR. HINNEFELD:** And the number of zeroes, that's
14 important.

15 **MS. BEHLING:** -- and the number of zeroes, I
16 think that -- that's --

17 **MR. HINNEFELD:** Yeah, that's the note I made.

18 **MS. BEHLING:** -- I think a more significant
19 issue.

20 **DR. BEHLING:** Who's got a calculator? Does
21 anybody have a calculator where they can --

22 **MR. HINNEFELD:** I've got an Excel spreadsheet.

23 **DR. BEHLING:** Multiply 1.91 times .9. What does
24 that tell you?

25 **MS. BEHLING:** 1.719.

1 **MR. GRIFFON:** 1.72, yeah. 1.719.

2 **DR. BEHLING:** Well, that would appear, because
3 that's what's in that table. So it may very well
4 end up being that he accounted for that 10
5 percent and 90 percent fraction by using the ICRP
6 60 factor as --

7 **MR. HINNEFELD:** I think that's what he's done
8 just based on seeing that -- that value.

9 **MS. BEHLING:** Okay. Yeah.

10 **DR. BEHLING:** Okay. In that case we will --

11 **MR. HINNEFELD:** I think that might be what he
12 did.

13 **MS. BEHLING:** Okay. We will look --

14 **MR. HINNEFELD:** Like I said, I hated that table.
15 I saw a number of dose reconstructions that had
16 tables like that where they combined two factors
17 without really explaining --

18 **MR. GRIFFON:** Without really putting how they did
19 it.

20 **MR. HINNEFELD:** -- that they had combined two
21 factors and it'd drive you nuts when you haven't
22 seen one like that, trying to figure out what in
23 heck they're doing.

24 **DR. BEHLING:** Okay.

25 **MS. BEHLING:** Okay.

1 **DR. BEHLING:** Okay. So we'll -- we'll take a
2 look at those. Let me just make a note here.
3 Okay. Then the same thing then applies for the
4 missed --

5 **MR. HINNEFELD:** The missed.

6 **DR. BEHLING:** Yes.

7 **MR. HINNEFELD:** It's the same table on this.

8 **DR. BEHLING:** Yes.

9 **MR. ALLEN:** Yeah, looks like they've got it broke
10 down by area there. That's the two factors for
11 these areas.

12 **MR. GRIFFON:** The 25 and 75 and 50/50, yeah, it's
13 broken down by work areas. Right?

14 **MR. ALLEN:** Yeah.

15 **MR. HINNEFELD:** Uh-huh.

16 **MR. ALLEN:** Can't tell the basis for it on this
17 spreadsheet here, but it looks like that's what
18 it is. Some areas it's 1.91 all for the one
19 range --

20 **MR. HINNEFELD:** Yeah, 1.91 in one range and zero
21 in the other, and some ranges it's -- yeah.

22 **MR. ALLEN:** It's split up differently in other
23 areas.

24 **MR. HINNEFELD:** Yeah.

25 **DR. BEHLING:** Okay. Shallow -- recorded shallow

1 electron dose. I think in this case the
2 individual may have double-dipped and actually
3 overstated. Shallow dose he assigned to -- you
4 have an option of assigning shallow dose to less
5 than 30 keV photon energy or to -- to electrons.

6 **MR. HINNEFELD:** Uh-huh.

7 **DR. BEHLING:** And I think he did both.

8 **MR. HINNEFELD:** Oh, okay.

9 **MS. BEHLING:** Is that this one?

10 **DR. BEHLING:** Yes.

11 **MS. BEHLING:** Because it was also the Hanford
12 case where the recorded -- the dosimetry data
13 initially appeared as if there was a shallow --
14 no. How did that work? That there was a shallow
15 dose -- maybe it's under the missed shallow dose.
16 We're going to get to that.

17 **DR. BEHLING:** In -- in this case they assigned a
18 shallow dose to both 30 keV -- less than 30 keV
19 photons and to betas. And in essence that's
20 doubling the -- the shallow dose.

21 **MR. HINNEFELD:** Yeah.

22 **DR. BEHLING:** You should either use one or the
23 other, but not both. Let's see. What do we have
24 here. Missed shallow doses. For shallow dose,
25 obviously the PROC -- procedure 6, addendum to

1 external dose reconstructor provides some means
2 of calculating shallow dose for complex-wide
3 situations, and that's formerly a number of zero
4 dosimeter readings LOD, and then you multiply it
5 by 2 and that's -- that multiplier is not really
6 one for maximizing, but it accounts for the
7 deficiency of the dosimeter. And so when you
8 divide that by 2, you're not doing what some of
9 the other people have done wrong in the past, but
10 that's a correction factor for the deficiency in
11 -- in monitoring shallow dose. And so when you
12 divide by 2, you're still then subject to a -- an
13 uncertainty. And the LOD for that was 15
14 millirem, and let me see here. I think he used a
15 professional judgment case here of 200 millirem
16 as a profession judgment.

17 **MS. BEHLING:** Yeah, he did. He used an LOD of
18 200.

19 **DR. BEHLING:** And then again --

20 **MS. BEHLING:** But again, it does say professional
21 judgment.

22 **DR. BEHLING:** I have no idea where that number
23 comes from.

24 **MS. BEHLING:** (Unintelligible)

25 **DR. BEHLING:** Yeah, one of the things -- yeah,

1 the statements made on page 15, reviewer's
2 comment, improperly estimated shallow doses, and
3 I have an exhibit here on page 16. I fully
4 understand why some of these errors are made, but
5 for instance, on page 16 you have the exposures
6 for this individual for the year 1974 and if you
7 look at Code 59, Code 59 is an external dosimeter
8 for the whole body. And what you see on the far
9 right-hand side -- not far right-hand, there's --
10 but the second to last and the one before that,
11 you have NP, which stands for non-penetrating
12 radiation, and then you have penetrating
13 radiation. And you'll see for instance, the
14 first entry -- which corresponds to month of
15 January, there are 12 entries which has a Code 59
16 -- and then you see obviously the five elements
17 for the TLD and -- and I guess the algorithm then
18 spits out that for -- for the first month, in
19 January, the non-penetrating dose is recorded
20 zero and the penetrating dose is recorded as 40.
21 And one would conclude that the dose really then
22 to the skin is zero, when in fact it's 40. Just
23 turns out to be that the penetrating/non-
24 penetrating dose were the same. And so when you
25 record it as non-penetrating, you subtract

1 penetrating from it and end up with a zero dose
2 which is in essence an artifact. There -- this
3 is not a missed -- this is not a missed dose
4 then, and therefore -- you tend to overestimate
5 the missed dose when your penetrating dose is
6 equal to the non-penetrating, and when you
7 subtract it you end up with a zero dose. The
8 truth is there was no non-penetrating -- there
9 wasn't a penetrating. It's not a missed dose,
10 it's just that --

11 **MR. HINNEFELD:** Penetrating dose to the skin as
12 well.

13 **DR. BEHLING:** And as I mentioned to you, from my
14 experience in the utilities, if you have high
15 energy photons as the ambient dose, your 7
16 millirem, your 300 millirem, your 1000 millirem
17 dose will always be the same, generally speaking.

18 **MR. HINNEFELD:** Right.

19 **DR. BEHLING:** And so when you subtract one from
20 the other to -- to determine what is your non-
21 penetrating, you end up with a zero dose when in
22 fact that's an artifact. The skin dose really is
23 40 in this case. And so I just wanted to point
24 that out. Again, it's claimant-favorable in this
25 case when you assume a zero dose and assign a

1 missed dose, when in fact it just turns out there
2 was no -- a dose that should have been assigned
3 as a missed dose --

4 **MR. HINNEFELD:** Right.

5 **DR. BEHLING:** -- in this case.

6 **MR. HINNEFELD:** Right, right. You're right.

7 **MS. BEHLING:** And again, it reflects on the
8 facility reporting requirements and the reporting
9 -- the way they report their (unintelligible due
10 to electrical interference in microphones).

11 **MR. HINNEFELD:** Right.

12 **MR. GRIFFON:** Going back to this question of the
13 algorithm now and -- I mean I noted in 1968 -- I
14 think it's -- and I didn't bring that file, but
15 on page -- I think it's on page 41 in the DOE
16 data for this person -- they -- I mean they have
17 an annual penetrating dose of 1910 for that year.
18 And I -- I would -- I'd love it if somebody could
19 describe to me how they came up with that number.

20 **MR. HINNEFELD:** You're in 1968?

21 **MR. GRIFFON:** Yeah, 1968. There's -- there's --
22 in this case I think they --

23 **MR. HINNEFELD:** Oh, you've got the -- oh, we
24 don't have the -- we don't have those here.

25 **MR. GRIFFON:** Oh, you don't have that.

1 **MR. ALLEN:** I could go grab it.

2 **MR. HINNEFELD:** We can go look them up.

3 **MR. GRIFFON:** Yeah, it -- it just -- it was
4 confusing to me to walk through that one. There
5 were a bunch of negative values in that column,
6 and I think they can be explained by the
7 algorithm that was used, but it wasn't clear how.
8 And I can see when I add all the -- I can make
9 the numbers work and come up with 1910, but I'm
10 not sure why a certain value is -- are in that
11 column. So I guess just to crosswalk, that was
12 difficult for me. And maybe it makes sense for
13 someone who is more --

14 **MR. HINNEFELD:** We'll look that up.

15 **MR. GRIFFON:** -- understands this data more.
16 Yeah.

17 **MR. HINNEFELD:** We'll look that up when we get
18 done with our discussion and we'll have something
19 for this week.

20 **MR. GRIFFON:** That's fine.

21 **MR. HINNEFELD:** If we can figure anything out.

22 **MR. GRIFFON:** I'm sure -- I'm sure you'll be able
23 to.

24 **DR. BEHLING:** Yeah, for that particular exhibit
25 here, if you look at it, I think the -- the

1 penetrating dose for that year, for the 12
2 cycles, was 590. I think if you actually look at
3 the numbers and the annual doses where they
4 collate them, they correctly identify the skin
5 dose at 680 or something like -- 670. I explain
6 that on page 15. If you look at the actual
7 annual doses which collates the shallow dose as
8 penetrating and non-penetrating, you realize that
9 you don't really have a zero dose.

10 **MR. HINNEFELD:** Right, right.

11 **MR. GRIFFON:** Right.

12 **MR. HINNEFELD:** Okay.

13 **DR. BEHLING:** So again, you have to be familiar.
14 If you -- if you only look at this, you may not
15 come to that conclusion, but in this case, again,
16 it benefits the claimant in the sense where you
17 assign a missed dose when in fact these are
18 really artifacts here. They're not zero doses at
19 all. And then --

20 **MR. GRIFFON:** I guess my only question on that,
21 Hans -- I don't disagree with you on this -- this
22 example for this year, but I think it varies from
23 year to year on how --

24 **DR. BEHLING:** Yes.

25 **MS. BEHLING:** Yes, that's what I --

1 **DR. BEHLING:** And that's one of the statements I
2 made is that, you know, when you look at the
3 instructions, you realize -- and -- do I have it
4 here? In one of them I included tables that they
5 give you and saying okay, for this year skin dose
6 is shallow dose -- is penetrating plus non-
7 penetrating, but it varies over time and you have
8 to be really careful.

9 **MR. HINNEFELD:** Right.

10 **MS. BEHLING:** Like Hanford.

11 **DR. BEHLING:** And at what point does a shallow
12 dose equal a skin dose, et cetera.

13 **MR. GRIFFON:** That's why I wanted just to clarify
14 for my own sake.

15 **MR. ALLEN:** Didn't we have one earlier where we
16 added the neutron in on one year's sheet --

17 **DR. BEHLING:** Yes.

18 **MR. ALLEN:** -- and not the other?

19 **DR. BEHLING:** Yes.

20 **MR. HINNEFELD:** Yeah.

21 **MS. BEHLING:** Yeah.

22 **DR. BEHLING:** And it gets very, very complex.

23 **MR. ALLEN:** Somebody had already added the
24 tritium dose.

25 **MR. HINNEFELD:** For a while.

1 **MR. ALLEN:** Yes, for a while.

2 **MS. BEHLING:** Yes.

3 **MR. HINNEFELD:** For some years, the tritium dose
4 is included. It's listed there and it's also
5 added over here. And other years it's listed
6 here and it's not added in.

7 **MS. BEHLING:** (Unintelligible)

8 **MR. GRIFFON:** Real archaeological dig
9 (unintelligible).

10 **MR. HINNEFELD:** (Unintelligible) thought this was
11 a good idea.

12 **MR. GRIFFON:** Can I -- can I touch on a couple
13 things?

14 **MR. HINNEFELD:** Uh-huh.

15 **MR. GRIFFON:** The -- the missed photon dose on --
16 in this instance, again going back to my topic,
17 my main topic I've hit on today, missed versus
18 unmonitored. I guess I look at the summary and
19 you see 231 millirem assigned for I think what
20 they're saying are 15 missing dose periods. I
21 think I came up with 17, but again, I'll agree
22 with it for the sake of argument. If I look at
23 this individual's photon dosimeter dose, he's got
24 about 8 1/2 rem, close to 9 rem, recorded for
25 photon dosimeter dose. That gives like an

1 average of 65 millirem per month.

2 **MR. HINNEFELD:** Okay.

3 **MR. GRIFFON:** If you're -- is it claimant-
4 favorable to assign that LOD over 2 in this
5 instance for those missing periods? They all
6 seem to fall within -- unless you have good -- a
7 good basis for saying that he was out of a -- out
8 of a work area, but they all seem to me to fall
9 within the '68 to '72 time period when he was
10 doing -- when he was getting most of his higher
11 external doses. And, you know, I guess the
12 question is, you've got a few gaps in his data,
13 you're assigning LOD over 2 and saying it's
14 claimant-favorable. I'm saying on average for
15 those years, he was getting about 65 millirem a
16 month. Why not -- I -- I'm -- I guess I'm
17 questioning, is that the most claimant-favorable
18 approach, or -- or a best estimate? I think in
19 this case you were trying to maybe hone in on it
20 a little closer.

21 **MR. HINNEFELD:** Yeah, they tried to -- they tried
22 to narrow in on this one, at least on the
23 external side. Let me think a minute.

24 **MR. GRIFFON:** It seems to me -- it didn't seem
25 logical to me, unless you have work history

1 justification, to say that he was jumping in and
2 out of hot areas.

3 **MR. HINNEFELD:** Does the record indicate -- I
4 mean is the record void for those years? Or does
5 it look like he had a zero reading? Or can we
6 tell for those months?

7 **MR. GRIFFON:** That's -- that's a good question.
8 I mean your report says 15.

9 **MR. HINNEFELD:** Zero readings, or 15 periods when
10 he wasn't -- 15 cycles when he wasn't monitored?

11 **MR. GRIFFON:** Fifteen where you assigned -- where
12 you assigned missed doses, missed photon doses.

13 **MR. HINNEFELD:** Okay. But I mean before that,
14 before we assigned 15 missed doses -- or were
15 they zero readings --

16 **MR. GRIFFON:** Yeah --

17 **MR. HINNEFELD:** -- 15 badge zero readings, or
18 were they --

19 **MR. GRIFFON:** I don't know. I don't have --

20 **MR. HINNEFELD:** -- were they 15 --

21 **MR. GRIFFON:** -- the record here.

22 **MS. BEHLING:** Unmonitored.

23 **MR. HINNEFELD:** -- months when we don't have a
24 result because --

25 **MR. GRIFFON:** I know. I know what you're saying.

1 Yeah.

2 **MR. HINNEFELD:** Okay. That would -- that would
3 certainly influence how we would approach the
4 problem.

5 **MR. GRIFFON:** See, I have in my notes here -- and
6 again, don't take these for granted, but I had --
7 I had like 17. I -- I'm using the word fields
8 were blank, which for me would say not zeroes,
9 but blank, no entries. Now, I don't know
10 Hanford's practices with this regard, you know --

11 **MR. HINNEFELD:** Right.

12 **MR. GRIFFON:** -- were they -- were they zeroes
13 that they just noted as blanks in the record. I
14 don't know.

15 **MR. HINNEFELD:** Let us do some checking on that
16 because I don't know sitting here.

17 **MR. ALLEN:** I'm just digging through the
18 spreadsheet. It's looking like a lot of zeroes
19 are pretty sporadic like a hundred -- you know,
20 low dose -- in one month it's a zero and then a
21 low dose the next month. I'm thinking it's just
22 less than sensitivity.

23 **MR. GRIFFON:** It could be.

24 **MR. ALLEN:** But I don't have the dose record in
25 front of me. I just have what they recorded

1 here.

2 **MR. GRIFFON:** Do you have zeroes in there, or
3 blanks? I don't --

4 **MR. ALLEN:** This is just the spreadsheet.

5 **MR. GRIFFON:** Yeah, yeah.

6 **MR. HINNEFELD:** It's not the record. It's what
7 they do for --

8 **MR. GRIFFON:** I thought there were blanks in the
9 actual data.

10 **MR. HINNEFELD:** I guess from -- you know, an
11 average of 65 millirem a month to me looks like
12 it probably varies quite a bit on either side of
13 that and you'll have some months quite a bit more
14 and some considerably less. If you go to half
15 that, or slightly less than half that, you're
16 below the LOD and it would look like a zero on
17 the badge.

18 **MR. GRIFFON:** Yeah.

19 **MR. HINNEFELD:** So what you've described so far
20 doesn't give me a lot of concern that this was a
21 situation where this guy should have had a result
22 there and didn't. Sounds like he probably had a
23 zero result there based on that kind of, you
24 know, monthly exposure experience. If he were
25 getting 500 a month and then there were months

1 missing or something like that, that would
2 probably cause me to worry more than 65 millirem
3 a month because it's just not that far from the
4 threshold of badge. You know, the average is not
5 that far from the threshold for the badge and I
6 expect to have quite a bit of variation around
7 the average, and I expect sometimes --

8 **MR. GRIFFON:** Well --

9 **MR. HINNEFELD:** -- vary below the threshold of
10 the badge.

11 **MR. GRIFFON:** I think 60 -- well, I don't know.
12 I -- I think it -- I mean in this case I think
13 you're honing in on that a little more, and I
14 think it probably -- this is my back of the
15 envelope here, almost literally. But that 65 per
16 month is also average from 1967 through '75, so -
17 -

18 **MR. HINNEFELD:** Oh, I see what you're saying. So
19 it wasn't just in an early period --

20 **MR. GRIFFON:** -- and the blanks were in '68
21 through '72 when he got more of -- it looked like
22 he got more of --

23 **MR. HINNEFELD:** Okay.

24 **MR. GRIFFON:** You know, so -- these aren't
25 whopping exposures, but you are honing in on --

1 on something that's closer to your 50 percent
2 cutoff, too.

3 **MR. HINNEFELD:** Okay. Let's see if we can draw
4 any conclusions from it later on this week.

5 **MR. GRIFFON:** I wish I had the hard --

6 **MR. HINNEFELD:** It's available to us. I just --
7 we just didn't bring it down here. I mean we
8 couldn't bring them all, so -- I guess we could
9 have, but we didn't.

10 **MR. GRIFFON:** Yeah.

11 **MR. ALLEN:** I could stick it on a stake real
12 quick, but...

13 **MR. HINNEFELD:** Well, let's -- let's try to get
14 through them.

15 **MR. GRIFFON:** Yeah, let's get through them.

16 **MR. HINNEFELD:** Mark's going to be here all week.

17 **MR. GRIFFON:** Yeah, that's fine. No, I'm not
18 going to be, but that's fine.

19 **MR. HINNEFELD:** Okay. Let's go ahead and get
20 through this report and then we'll --

21 **MR. GRIFFON:** We can hold that. It's fine.

22 **DR. BEHLING:** Last finding is on page 19. It
23 involves the internal dose assigned for a
24 hypothetical exposure. As we always do, we try
25 to run the Excel workbook in identifying what the

1 exposures were for photons, electrons, alpha
2 particles, and for some reason or another we were
3 able verify everything, but we were unable to
4 reproduce the dose assigned to the alpha reading
5 radiation. And we can't figure that one out
6 since obviously this is a computer-generated set
7 of data.

8 **MS. BEHLING:** And I was -- excuse me, Hans.

9 **DR. BEHLING:** Go ahead.

10 **MS. BEHLING:** I -- I was going to say, I believe
11 on this one I used version 3.03 and I went back
12 to an old -- the only older version that I have,
13 which was 3.02.12, and tried to see if maybe they
14 used an older version, and I -- I still was not
15 able to reproduce that alpha dose.

16 **MR. ALLEN:** I think the difference is, but I've
17 got to check this out for us. I think the
18 difference was that they actually used testes on
19 this one but they didn't use high uranium. High
20 uraniums were basically a year-end process at
21 Fernald or something.

22 **MS. BEHLING:** Okay.

23 **MR. ALLEN:** So they used a lower uranium value
24 for a reactor facility, and they used testes.

25 **MS. BEHLING:** Okay. That may be it.

1 **MR. ALLEN:** Basically, they did this one right.
2 That -- that threw you. But he said he was able
3 to reproduce the numbers. I never verified it
4 myself.

5 **MS. BEHLING:** Okay. I'm going to check that.

6 **MR. HINNEFELD:** Okay. So it would it be non-U --
7 non-U and then reactor?

8 **MS. BEHLING:** That's right.

9 **MR. ALLEN:** Yes.

10 **MR. HINNEFELD:** Non-U, reactor, and then testes
11 and see what you get.

12 **MS. BEHLING:** Okay.

13 **MR. HINNEFELD:** See if that matches.

14 **MS. BEHLING:** Okay. Okay. Is that it for that
15 one? I have --

16 **DR. BEHLING:** Let me just be sure.

17 **MR. GRIFFON:** I've got a couple --

18 **DR. BEHLING:** Let's see here, CATI reports --
19 yeah, obviously this guy had a series of events
20 here involving everything from contamination of
21 his hand when he borrowed a pen from a coworker.
22 And of course the action cited was that they
23 surveyed it, they decon'd the skin. They did a
24 nasal smear which turned out negative and did --
25 did a whole-body count. Everything turned out

1 negative, et cetera. And then also that same
2 year, 1970, he had a glove contamination event.
3 Again they used a survey to assess the
4 contamination, nasal smear, and it sounds like
5 they -- they did everything that they probably
6 should have done in assessing any potential
7 contamination that involved these events from the
8 pen to the cutting his finger, as he did on -- in
9 April of 1971 here.

10 I guess in summary perhaps what they could have
11 done is to perhaps follow up with some urinalysis
12 that may have potentially found some internal
13 exposure. But given the high dose assigned to
14 him from the hypothetical, it's -- it's just my
15 intuition that more than likely any doses he
16 would have received and was not necessarily
17 monitored by whatever method they took would have
18 been captured by the assigned dose. So I didn't
19 make any issue or make any finding on this case.
20 Yeah, I think that's it. Do I get a break from
21 talking for a while?

22 **MR. GRIFFON:** Can I just ask two -- two things on
23 this. One, I think the uncertainty on the
24 recorded photon dose, you guys -- you raised this
25 as a finding. Right?

1 **DR. BEHLING:** Uh-huh.

2 **MR. GRIFFON:** But I think in this kind of case
3 it -- it could play a pretty critical -- I mean I
4 think what would happen actually is that if you
5 added in uncertainty on that 8.78 rem recorded --
6 obviously annually, but if you added that in,
7 even if the numbers got closer I think what would
8 end up happening is you'd have to go back and
9 tweak the internal dose a little --

10 **MR. HINNEFELD:** Could be.

11 **MR. GRIFFON:** -- more realistically.

12 **MR. HINNEFELD:** Could be.

13 **MR. GRIFFON:** You know, so it may not make a -- a
14 difference in the outcome, but some of these
15 things could push it over, the way it stands
16 right now. You know what I'm saying?

17 **DR. BEHLING:** If everything (unintelligible) --

18 **MR. GRIFFON:** Given the hypothetical internal
19 rate.

20 **DR. BEHLING:** -- dose.

21 **MR. GRIFFON:** So I think -- I think that's
22 something that, you know -- you know, is a pretty
23 important thing to resolve, and procedurally or
24 whatever, they're not using what's on the
25 procedures now and they're just assigning a

1 constant. I think that should be resolved,
2 especially when you get to closer cases. It's
3 going to -- could play a role I suppose.

4 **MS. BEHLING:** I think the implementation guide --
5 implementation guide, one, and using the normal
6 distribution.

7 **MR. HINNEFELD:** Yeah. Yeah, it was a -- this is
8 a testicular? What was the cancer in this one?
9 I'm getting them confused now.

10 **DR. BEHLING:** Yeah, this one was a testicular
11 cancer.

12 **MR. HINNEFELD:** I'll have to find out about that,
13 because that is an awfully high DCF.

14 **MS. BEHLING:** (Unintelligible)

15 **DR. BEHLING:** Let me ask Dave on -- on the issue
16 -- do you have -- let's just hypothetically go
17 through a mental exercise that you can visualize.
18 Let's assume you have a recorded dose for an
19 individual of 10 rem and you assign that as a
20 constant with no uncertainty. And then you say
21 well, you know, there is an uncertainty, a sigma
22 value that we should assign to that dose, and
23 let's just for -- for simplicity assume that it's
24 30 percent.

25 (Whereupon, Dr. Neton enters the

1 proceedings.)

2 **DR. BEHLING:** So you could, in essence, have a 10
3 rem plus a sigma value of 3 rem assigned to that
4 individual. Now you subject that to a Monte
5 Carlo analysis that incorporates all the other
6 variables and then you essentially select a 99th
7 percentile value of that Monte Carlo analysis.
8 What would that dose that is now defined of -- as
9 10 rem as a constant versus 10 rem with a sigma
10 value of 3 result in an effective dose? If you
11 were to say the same -- you -- you -- for the
12 first case, you develop a POC and let's assume
13 for the 10 rem constant with no uncertainty you
14 get a POC of let's say 25 percent. And then you
15 run the same calculation but you say 10 rem plus
16 a sigma value of 3 rem, and you get a new POC.
17 What I would like to know is what would be the
18 single dose, a deterministic dose that would give
19 you the same value with everything else being
20 constant? What would you have to put in as a
21 dose instead of 10 rem plus 3 rem sigma as a
22 single dose in order to get the same POC
23 calculation? Do you know what that -- just a
24 ballpark estimate?

25 **DR. NETON:** Its varies depending on the cancer

1 and --

2 **MR. GRIFFON:** Cancer model.

3 **MR. HINNEFELD:** Cancer model. That should in the
4 cancer model.

5 **DR. NETON:** There are some where --

6 **DR. BEHLING:** But let's assume you keep
7 everything a constant --

8 **MR. HINNEFELD:** Hans, it's going to vary
9 depending on the number of years, and you name
10 it.

11 **DR. NETON:** I could tell you, Hans, you get the
12 same number oftentimes if you put 10 as a
13 constant or for a distribution value, it makes no
14 difference because the uncertainty of the dose
15 model -- the dosimetry calculation is extremely
16 small compared to the overall uncertainty and all
17 the other hundreds of --

18 **MR. HINNEFELD:** Use the risk model that IREP
19 applies to get the --

20 **DR. BEHLING:** Yeah, I'm trying to gauge the
21 significance --

22 **MR. HINNEFELD:** -- overwhelms the rest of the --
23 if they got 30 there, that overwhelms the
24 uncertainty of the dose.

25 **DR. BEHLING:** Yeah. Well, when you even ask for

1 your (unintelligible) --

2 **MR. GRIFFON:** It does depend on the cancer model.

3 **DR. BEHLING:** -- in so many cases the sigma value
4 has been deleted because we know it's a very
5 complex thing to calculate and people have simply
6 ignored it. And I guess Mark is raising the
7 question, what would happen if -- you know, what
8 -- how does that sigma value really impact the
9 POC.

10 **DR. NETON:** The sigma value, if it'd been deleted
11 or not put in there, it's my understanding the
12 way you do this is that that value -- the
13 constant should be an upper limit of the dose.

14 **MR. HINNEFELD:** That's what it -- that's what
15 it's supposed to be. That means that the number
16 is supposed to have (unintelligible) because of -
17 - because of one of a number of things. One
18 would be if there's a DCF for this organ that's -
19 - the entire range would be kept at less than 1.
20 So -- but rather than use that DCF, we're going
21 to use a DCF of 1. So we apply that one rather
22 than this lower DCF --

23 **MR. GRIFFON:** So that's your maximizing
24 assumption.

25 **MR. HINNEFELD:** -- we actually are -- we're

1 actually maximizing the actual dose number rather
2 than applying the uncertainty amount. That's
3 even --

4 **MR. GRIFFON:** Well, that --

5 **MR. HINNEFELD:** You know, that's one application.
6 That's one position that's been made that we have
7 yet to validate. That's from the first 20. We
8 have yet to validate that that's the fact, but
9 that's kind of what we -- what the position was.
10 Other -- I've seen it stated, I don't know that
11 this was everything (unintelligible) abide by,
12 but if we maximize things like geometry and --
13 and maximize the effectiveness of the energy band
14 -- like we know the photons are spread over
15 several -- over a couple energy bands, but we're
16 going to put them all in the most energy
17 effective range, the 30 to 250 -- then that's
18 overestimating. And so rather than -- so we're
19 not really recording the true dose. We're
20 recording the overestimate of the dose, so we're
21 not going to -- we're going to treat that as a
22 constant because it's a high estimate.

23 **MR. GRIFFON:** See, here you didn't do that,
24 though. This case you didn't do it.

25 **MR. HINNEFELD:** I have to check out why it would

1 be okay on this one.

2 **MR. GRIFFON:** Right.

3 **MR. HINNEFELD:** I would have to check why it
4 would be okay on this one not to include the
5 uncertainty on the measured dose because I --
6 just sitting here today, I can't figure it out.

7 **MR. GRIFFON:** That's what I -- I was asking
8 specifically for this case.

9 **MR. HINNEFELD:** Yeah.

10 **DR. NETON:** But that is something we
11 (unintelligible) -- I do remember from the first
12 20 that they had taken some liberties and put
13 them in as constants and saying that it was
14 claimant-favorable because you didn't include any
15 other correction factors would tend to lower the
16 dose. But I think we agreed that we need to
17 demonstrate that that was the case.

18 **MR. HINNEFELD:** Yes, yes.

19 **DR. NETON:** It's -- it's a real -- it's all over
20 the map as to how much that uncertainty really --

21 **DR. BEHLING:** Yeah, just curious.

22 **DR. NETON:** I tell you, if it's plus or minus 30
23 percent, my prediction is it will make almost
24 zero difference in POC value. A 30 percent swing
25 on a dose input value with models that span a

1 large, you know, range, I mean even -- and if
2 you have alpha dose on top of it because the
3 alpha (unintelligible) effectiveness factors goes
4 anywhere from like 5 to 100 times that dose. So
5 there's all kinds of other parameters in there
6 that drive those uncertainties hugely. But we
7 haven't -- we haven't done a detailed analysis
8 of...

9 **MR. GRIFFON:** Yeah. I'm just -- I'm pointing out
10 when you get to these cases that sort of start to
11 approach your 45 percentile, I think we need to
12 at least --

13 **DR. NETON:** Yeah, I agree.

14 **MR. GRIFFON:** -- (unintelligible).

15 **MR. HINNEFELD:** We've got several things to check
16 on this one I think.

17 **MR. GRIFFON:** The last --

18 **DR. NETON:** If it's in the 45 percentile, I
19 suspect there's a lot more going on that's
20 claimant-favorable for a (unintelligible).

21 **MR. HINNEFELD:** There are.

22 **MR. GRIFFON:** Yeah, the internal is very
23 claimant-favorable. Right, right.

24 **MR. HINNEFELD:** Now, Mark wanted to talk a little
25 bit about the plan for tomorrow and --

1 **DR. NETON:** Yeah, my copy indicated you wanted to
2 --

3 **MR. HINNEFELD:** -- so we may want to just chat
4 about that for a minute. If anybody who's not
5 going to be involved in that conversation wants
6 to take a break, I guess they can do that right
7 now. We can sort out what's going to happen
8 then.

9 **DR. NETON:** Well, I guess the first question is
10 how many people here are going to attend and
11 participate? The problem is -- is -- I don't
12 know how you're running. Are you going to meet
13 tomorrow morning to finish up these 18?

14 **MR. HINNEFELD:** I don't think so.

15 **MR. GRIFFON:** No, we're going to get through.

16 **MR. HINNEFELD:** I don't think we're going to need
17 it.

18 **DR. ROESSLER:** No, we'll get through.

19 **MS. BEHLING:** (Unintelligible) zip right along.

20 **DR. NETON:** I've been trying to get -- see,
21 tomorrow morning the idea was that it would sort
22 of be -- we have no court recorder scheduled for
23 tomorrow because there was -- you know, there was
24 a possibility that you guys were -- tomorrow
25 morning.

1 **MR. HINNEFELD:** So Ray was scheduled to -- we
2 have had actually this room scheduled for this
3 conversation tomorrow morning.

4 **DR. NETON:** Right. And I was going to meet
5 upstairs in 124.

6 **MR. HINNEFELD:** Right, uh-huh.

7 **DR. NETON:** And that's why I came down here. I
8 was going to get set up and try to get some jury-
9 rigged NOCTS access, which turns out is not as
10 easy as I thought. If we can convene here
11 tomorrow morning with no court recorder required
12 and that on the agenda is going over case files.
13 I think (unintelligible) is just heading out from
14 what I saw at --

15 **MR. HINNEFELD:** Yeah, he wanted to get on NOCTS,
16 so...

17 **DR. NETON:** I mean so he may get bored, but I was
18 going to go through -- I selected the 66 -- I
19 have a listing of 66 cases we've done so far for
20 Mallinckrodt that are compensable, the 6 that
21 aren't. And I was going to go over some examples
22 and pick whatever anybody else wants and go
23 through as to what approaches were used. And
24 then I have three new cases that I just received
25 from ORAU that are done sort of proof of

1 principle using the profile, although, you know,
2 you can't get all possibly flavors, but just to
3 get an idea of how those will done against the
4 profile. That was going to be sort of show and
5 tell and no substantive discussion of issues
6 because we can't get into that if the court
7 recorder is not available. Now, if Ray is
8 available and we go quickly through the demo
9 files, then maybe we could get into some
10 discussions.

11 **MR. GRIFFON:** Well, and -- and then the plan
12 generally was in the afternoon we were going to
13 get into the SC&A question resolution?

14 **DR. NETON:** Yes. Well, discuss the questions and
15 stuff. That was the plan in the afternoon, talk
16 about -- there's some internal dosimetry
17 questions, external, and some combined questions.
18 Cindy Bloom is coming in today. She'll be here
19 for tomorrow all day and Thursday. She is more
20 knowledgeable about the specifics of Mallinckrodt
21 than I am. And Janet Westbrook is going to be
22 available by telephone for any real nuts and
23 bolts issues that go to data. So that's the
24 plan. I'm encouraged to hear we can meet here
25 tomorrow. It sounds like you guys are going to -

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MR. HINNEFELD: We'll just make a point of staying till we're done.

DR. NETON: Well, I don't want to, you know, tax anybody.

MS. BEHLING: No, we'll get there.

DR. NETON: If you can do that, then great. Then tomorrow morning we'll meet here, say 8:30-ish. Is that when you started today or --

MR. HINNEFELD: It's when we tried to start today.

MS. BEHLING: Depends on when our cab gets here.

DR. BEHLING: Taxi cab drivers --

MR. HINNEFELD: Depends on how good of directions we give them.

DR. NETON: Well, we have two full days for Mallinckrodt, so I feel we've got plenty of time. I mean if we want to start at 9:00 to make sure people can get here and get some coffee, that's fine by me. I'll make sure I'm ready to set up with the projector and everything.

MR. GRIFFON: Well, I was hoping to head out tomorrow night, so --

DR. NETON: Okay, 8:30 then. We'll start at 8:30 tomorrow.

1 **MR. GRIFFON:** I mean I can --

2 **DR. NETON:** Yeah, we'll go through the questions,
3 and Thursday was really sort of an open agenda
4 item. It had just general more discussion, and I
5 don't know if we're going to solve all of the
6 Mallinckrodt issues tomorrow. This is a little
7 ahead of where I -- it needs a little further
8 advance than I may want to hold it, but it's
9 fine. I mean if we can get these issues on the
10 table. I will -- I need to talk to Leroy,
11 though, because he was not planning on having the
12 NOCTS available here until tomorrow afternoon.

13 **MR. HINNEFELD:** Okay.

14 **DR. NETON:** So I'll make -- I'll try to see if I
15 can get that hooked up. There may have to be
16 some people mucking around in here while you're
17 deliberating. Okay. So how many people are
18 planning on attending then tomorrow? Gen's going
19 to be here. Okay. So pretty much Hans and Kathy
20 -- this will be right up your alley, and then
21 we're going to be going over some case files,
22 which is, you know, how we've approached the
23 Mallinckrodt cases thus far and how we intend to
24 do the remaining. Turns out there's really only
25 90 -- 127 cases of Mallinckrodt that are not in

1 the SEC, people who started work after 1948 and
2 worked at the Destrehan Street facility. So of
3 those 127, you know, we're going to -- I'm going
4 to try to -- I'm going to show you three that
5 have been done according to profile. And turns
6 out we probably have done about 30 of them
7 already using the -- some similar techniques to
8 what you've seen already, the 20 radionuclides
9 mix and that kind of stuff.

10 **MS. BEHLING:** (Unintelligible) we don't have more
11 board members here.

12 **DR. NETON:** I will leave this stuff here.

13 **DR. ROESSLER:** You're going to be here.

14 **MS. BEHLING:** Can we take a break?

15 **MR. HINNEFELD:** Yeah, we can take a break for a
16 couple minutes.

17 **MR. GRIFFON:** There's one more point on this last
18 case. It doesn't make sense to --

19 **MR. HINNEFELD:** Yeah, go ahead.

20 **MR. GRIFFON:** The question I had was, the Hanford
21 worker, was he doing any glovebox work? I think
22 we talked about this sometime.

23 **DR. BEHLING:** Yeah.

24 **MS. BEHLING:** Yeah.

25 **DR. BEHLING:** I mean he tore -- he tore --

1 **MR. GRIFFON:** Question I had.

2 **DR. BEHLING:** -- one of the gloves and, you know,
3 so --

4 **MR. GRIFFON:** I don't know the extent of his
5 glovebox work over time, but I guess the question
6 I had was -- especially -- I saw that recent TIB
7 released on the applicability of -- or
8 corrections to be used for certain organ doses,
9 and this is a testicular cancer. You got I
10 imagine lapel monitoring. Was that taken into
11 account, the glovebox -- potential glovebox
12 exposures? I mean there was a lot of corrections
13 given to -- to the various, you know, doses here
14 for energy levels for other -- you know, did
15 anyone take into account the glovebox question?

16 **DR. NETON:** Up until now the glovebox corrections
17 that we've been using were only for cases that
18 were either clearly non -- or probably clearly
19 non-compensable. We didn't have a refinement.
20 We knew it couldn't be higher than, like I said,
21 a factor of 10. So we just, you know, jack it up
22 by a factor of 10 and say that we will -- we're
23 in the processing of refining that TIB right now.

24 **MR. GRIFFON:** Yeah. I'm not saying it wasn't
25 even in -- it clearly wasn't available at the

1 time this --

2 **DR. NETON:** Right. That's what I'm wondering --

3 **MR. GRIFFON:** Right.

4 **DR. NETON:** It might have not.

5 **DR. BEHLING:** From the description, I'm not sure
6 he was a -- a typical glovebox worker.

7 **MR. GRIFFON:** Right. I'm not clear on that,
8 either. Appears, I should say.

9 **DR. BEHLING:** He worked as an engineer, generally
10 in the B Plant as a chemical technologist in the
11 PUREX lab --

12 **MR. GRIFFON:** So it might have involved very
13 minimal --

14 **MR. HINNEFELD:** Here's kind of a description,
15 some of the CATI quotation, and -- let's see.

16 **MR. GRIFFON:** Chemical technologist.

17 **MS. BEHLING:** (Unintelligible)

18 **MR. HINNEFELD:** Yeah. Receiving process samples,
19 breaking samples down, radiochemical analysis,
20 decontamination activities, lab hoods, and
21 spills. Sounds like he worked in the laboratory
22 more than a glovebox --

23 **MR. GRIFFON:** Rather than a glovebox setting,
24 yeah.

25 **DR. BEHLING:** Yeah, I don't think this is a

1 typical glovebox worker.

2 **MR. GRIFFON:** Okay, I wasn't clear on that. I
3 know I saw that one incident with a glove --
4 related to a glovebox and I didn't know if he was
5 -- did that for a period of time or whatever.

6 **MR. HINNEFELD:** Right.

7 **MR. GRIFFON:** That was it. Okay. Take a break.

8 **MS. BEHLING:** Can we go --

9 **MR. HINNEFELD:** Okay. Break for a few minutes.
10 Ten minutes?

11 (Whereupon, a recess was taken from 2:35
12 p.m. to 2:55 p.m.)

13 (Whereupon, Dr. Neton was unavailable for the
14 remainder of the day.)

15 **MS. BEHLING:** All right. I guess I'm going to
16 start now with tab 31, and the rest of these
17 really will go quite quickly, I -- I believe,
18 just because when I scanned through these I
19 didn't see any new issues that we really haven't
20 discussed before. But we'll still go through
21 each of the tabs, and if anybody has any
22 questions, you know, just stop -- stop us along
23 the way. Again, tab 34 (sic), and this is case
24 number 010556 and this was our second Hanford
25 case of these 18. This case, the employee had

1 several jobs, job titles -- pipefitter,
2 maintenance engineer, operations specialist. He
3 was employed from September of 1980 I guess up
4 until present and was diagnosed with prostate
5 cancer in July of 2002.

6 The dose reconstructor indicated that this was --
7 they -- they proceeded with this dose --
8 reconstructing this dose in an overestimation
9 using overestimating techniques for calculating
10 the dose, and their dose was 27.7 rem and that
11 resulted in a probability of causation of 16.6
12 percent.

13 And if you look down Table 1, as you can see, the
14 -- the biggest contributor of the dose was the
15 missed neutron dose, which was over 10 rem. And
16 I believe in this case there were two findings,
17 and I do have to make two corrections here. We
18 sort of went back into these cases after we were
19 done and Mark and I had been working on the
20 matrix and the checklist, and some cases I didn't
21 identify all the findings appropriately in the
22 text. And in this particular case, in Table 2, I
23 --

24 **MR. ALLEN:** What page?

25 **MS. BEHLING:** -- on page 7, I erroneously marked

1 that we had a finding at C.2.1 and actually the
2 finding should be the missed photon dose, which
3 is C.2.2. It's the same number of findings, but
4 I just checkmarked the wrong box there. The
5 second issue I see that I didn't do here is on
6 page 9 under the photon recorded dose, under our
7 reviewer's comments, that's where I should have
8 inserted finding 31.1-C.4.1. And the issue here
9 was failed to account for photon dose
10 uncertainty, and this is the same issue where the
11 dose reconstructor had a recorded dose. He
12 entered it as a constant with no uncertainty,
13 which is not what is recommended by OCAS-IG001,
14 and I believe we've touched on that many times
15 now.

16 The second issue, again Hans got the brunt of --
17 of all of the findings and he discussed this in
18 his Hanford case, and this is an issue where when
19 we -- we did -- it was an inappropriately
20 accounted for maximum potential missed dose. And
21 when you go into the IREP code, the actual dose
22 is correct. They entered a median dose with
23 geometric standard deviation of 1.52, and we
24 could reproduce that dose. However, it's the
25 wording that appears in the dose reconstruction

1 report that we're questioning because, again, the
2 dose reconstructor indicated that the maximum
3 potential missed dose of 4.56 rem from photons --
4 that was the value that was calculated and that
5 this was entered as a 95th percentile of the
6 lognormal distribution. And it's just confusing
7 when you actually go into IREP and you tally up
8 the total number that are the maximum dose. You
9 won't come up with this 4.56; you come up with
10 one-half that value, but that is correct as far
11 as the dose that's been entered into IREP. It
12 was a correct dose entered into IREP along with
13 the standard -- the standard deviation of 1.52.
14 However, it's -- we're just questioning the
15 wording that's put into this boilerplate dose
16 reconstruction report.

17 **MR. ALLEN:** We struggled with that ourselves
18 so...

19 **MR. HINNEFELD:** Yeah.

20 **MS. BEHLING:** Yeah. That's -- those are the only
21 two findings in this particular case. The only
22 thing I will point out, because it's something
23 that we did talk about earlier and I just marked
24 this more as an observation. As I mentioned, a
25 lot of times when we do the -- when we're going

1 through the dose reconstruction reports, when we
2 go through our reference list, we will find
3 references that aren't necessarily appropriate.
4 In this case, this is the ORAU-PROC 6 reference
5 that should have been -- and they're referencing
6 that -- that Attachment E, but they're using an
7 older version and they did not use the PC-1
8 version which was dated November 7th, 2003. So
9 to be technical, they -- they -- technically they
10 used the wrong -- the wrong reference in that
11 dose reconstruction report. I -- I just marked
12 that as an observation.

13 **DR. ROESSLER:** I have a question on this case,
14 and it probably elapsed this morning. I think we
15 talked about it. This is dose to the prostate
16 using the bladder as the surrogate organ and in
17 case 23 the testes was used.

18 **MS. BEHLING:** Yes.

19 **DR. ROESSLER:** What was the difference on that,
20 Kathy?

21 **MS. BEHLING:** Okay. Initially, the -- the
22 implementation guide states that you should use
23 the testes as the surrogate organ for the
24 prostate. However, TIB --

25 **MR. HINNEFELD:** 5.

1 **MS. BEHLING:** -- 5.

2 **MR. HINNEFELD:** OTIB-5.

3 **MS. BEHLING:** -- OTIB-5 states that you should
4 use the bladder as the surrogate organ for the
5 prostate.

6 **DR. BEHLING:** For external.

7 **MS. BEHLING:** For external dose. And so there's
8 an inconsistency in the procedures and I believe
9 Dave said that possibly back when they did this
10 dose reconstruction -- or did that dose
11 reconstruction, both the TIB and the
12 implementation guide specified the testes. Is
13 that correct?

14 **MR. ALLEN:** Everything originally specified
15 testes, and that was a question we raised
16 ourselves and decided bladder was a much better
17 surrogate and changed OTIB-5 several months ago,
18 but this is past tense here.

19 **DR. ROESSLER:** So you're saying scientifically,
20 the bladder is the more appropriate surrogate,
21 and which would be more claimant-friendly?

22 **MR. ALLEN:** Testes.

23 **DR. BEHLING:** Testes. Yeah, especially if it's
24 an AP geometry exposure.

25 **DR. ROESSLER:** I'm trying to think of the anatomy

1 here.

2 **DR. BEHLING:** Well, the prostate sits right at
3 the neck of the bladder and so it would be more
4 subject to -- to photon attenuation as would be
5 the testes. So testes would clearly be more
6 claimant-favorable for AP geometry using external
7 exposure -- for -- for (unintelligible) exposure,
8 there's no question.

9 **DR. ROESSLER:** Okay.

10 **MS. BEHLING:** Okay. So those are the only two
11 issues with tab 31, with the Hanford.

12 Okay. We'll go on to tab 32, and this is Nevada
13 Test Site, and it's case number 006704 and --

14 **MR. GRIFFON:** Just for the record, I'll have to
15 recuse myself from this Nevada Test Site case.

16 **MR. HINNEFELD:** Oh, okay.

17 **MS. BEHLING:** Okay.

18 **MR. HINNEFELD:** Okay.

19 **MS. BEHLING:** In this particular case, it was a
20 female employee who was diagnosed with breast
21 cancer in 2001 and actually worked for only a
22 several -- a few months in 1970 and then again in
23 1979. NIOSH derived a dose of 17.3 rem which
24 resulted in a probability of causation of 28
25 percent. Here again the majority of the dose was

1 associated with the internal dose by using the
2 hypothetical internal dose model. Let me see
3 here -- again, the first issue -- the first
4 finding we have on page 9 is finding 32.1-4 -- C-
5 4-2 -- .2, I'm sorry, inappropriate missed photon
6 dose uncertainty. And here again it is what we
7 have seen throughout. If you're going to
8 maximize the dose, you use LOD times 10, enter
9 that as a constant into IREP with no uncertainty,
10 or you can use a best estimate where you take LOD
11 divided by 2 times N and enter that as a
12 geometric mean with a standard -- geometric
13 standard deviation of 1.52. And in this case
14 they inappropriately entered it as a median value
15 of a lognormal distribution when they should have
16 actually entered it as a constant. And that's,
17 again, associated with that ORAU-TIB-10.

18 **MR. HINNEFELD:** TIB-10.

19 **MS. BEHLING:** TIB-10.

20 **MR. HINNEFELD:** Right.

21 **DR. ROESSLER:** Are there any claimants ever male
22 with breast cancer?

23 **MR. HINNEFELD:** Beg your pardon?

24 **DR. ROESSLER:** Are there -- have you ever had any

25 --

1 **MR. HINNEFELD:** Yeah. Male claimants with --
2 yes.

3 **DR. ROESSLER:** Okay.

4 **MR. ALLEN:** We have some now. I don't know if
5 we've completed them or not, but we've had -- I
6 know there's some in there.

7 **MS. BEHLING:** I -- I know. I thought about that
8 when I said about the breast cancer. Yeah, you
9 can certainly have --

10 **DR. BEHLING:** Well, we also have records of -- of
11 the actual dosimetry, and in this case we were --
12 based on the name -- aware of the fact that this
13 was a female.

14 **MS. BEHLING:** Yeah.

15 **MR. HINNEFELD:** Well, but -- but the gender of
16 the claimant is part of the claimant -- claim.

17 **DR. ROESSLER:** Yeah, part of the record.

18 **MR. HINNEFELD:** Part of the record.

19 **DR. ROESSLER:** So you don't have to go by name.
20 That could be dangerous, too.

21 **MR. HINNEFELD:** No.

22 **MR. ALLEN:** No. No, we don't.

23 **MR. HINNEFELD:** There's a gender-specific --

24 **MR. GRIFFON:** Yeah.

25 **MR. HINNEFELD:** -- the IREP model.

1 **DR. ROESSLER:** Yeah, I remember looking one of
2 these up on that. I think it might -- might have
3 been this one.

4 **MS. BEHLING:** Okay. And then we can skip to page
5 12 under the audit of the internal doses and here
6 again, I -- I identified two findings and they
7 both have to do with the hypothetical internal
8 dose model, the fact that this was obviously a
9 breast cancer and they used the colon as the --

10 **DR. BEHLING:** Surrogate.

11 **MS. BEHLING:** -- the surrogate organ, where they
12 could have used the breast itself because that's
13 the organ of interest or tissue of interest in
14 this particular case, which obviously results in
15 an overestimating or conservative dose, internal
16 dose. And also in this particular case, I
17 believe --

18 **DR. BEHLING:** 28.

19 **MS. BEHLING:** Let's see. Is this a 28 also? No,
20 I didn't identify this one as a -- as -- they did
21 use the 28 radionuclides and I should have
22 actually incorporated that also into our findings
23 for consistency, which I didn't in this
24 particular case. But with this being Nevada Test
25 Site, they should have actually also used the 12

1 radionuclide model for this, for the internal
2 dose calculation.

3 **MR. HINNEFELD:** I think we make allowance for
4 Nevada Test Site --

5 **MS. BEHLING:** Okay.

6 **MR. HINNEFELD:** -- for using the 28 radionuclide.
7 I think that -- I have to figure out where we
8 wrote that because of --

9 **MS. BEHLING:** Okay.

10 **MR. HINNEFELD:** -- Because of fission products.

11 **DR. BEHLING:** Fission products, right.

12 **MS. BEHLING:** Yes.

13 **MR. ALLEN:** Right. I mean that's the whole --

14 **MR. HINNEFELD:** That's why.

15 **DR. BEHLING:** Fission products is what drives the
16 28 versus 12, the reactor being a source term for
17 fission products.

18 **MS. BEHLING:** Yeah.

19 **DR. BEHLING:** So that's probably something we
20 don't want to --

21 **MR. HINNEFELD:** The 28 is probably okay.

22 **MS. BEHLING:** Okay. I didn't cite it in this
23 one.

24 **MR. HINNEFELD:** It's not written here.

25 **MS. BEHLING:** The reason I have two findings is

1 because I indicated there you selected the wrong
2 model and also obviously then you didn't account
3 -- or you improperly accounted for the
4 hypothetical internal dose.

5 **MR. HINNEFELD:** Yeah, the dose is different
6 because of the model selection.

7 **MS. BEHLING:** So it's just dose.

8 **MR. HINNEFELD:** Yeah.

9 **MS. BEHLING:** Yes.

10 **MR. HINNEFELD:** And I looked at -- this is one of
11 the cases that I -- I was -- that I looked at
12 getting ready for the meeting and we kind of
13 (unintelligible) --

14 **MS. BEHLING:** Sure.

15 **MR. HINNEFELD:** And the work -- the spreadsheet
16 that has the dose to the breast is right there in
17 DR development --

18 **MS. BEHLING:** Yes.

19 **MR. HINNEFELD:** -- so -- but they didn't use it,
20 they used colon, which is the highest non-
21 metabolic or the routine choice, which was the
22 original approach of TIB-2 was highest non-
23 metabolic.

24 **MS. BEHLING:** So there was -- there was a reason
25 why we didn't cite the 12 and 28 radionuclides in

1 this particular case.

2 **DR. BEHLING:** I'm not even sure -- I won't give
3 myself credit for saying the fission products
4 would have been there that would warrant the 28,
5 but maybe it was just a gratuitous oversight on
6 our part that we did.

7 **MS. BEHLING:** No, come on. Okay. Unless there's
8 any other questions on this particular case,
9 we'll move on to tab 33. And tab 33 is case
10 number 5206, which is a Fernald case. And again,
11 there is very few findings in this particular
12 case but I'll give you an overview.

13 This employee worked from 1955 until July of
14 1994. He worked as a laborer and was diagnosed
15 with four basal cell skin carcinomas in 1993 and
16 1998. Two of the skin cancers were on the eyelid
17 and two were in -- on the back, in the back -- on
18 the back region. And actually when NIOSH
19 calculated the dose in this particular case, the
20 dose actually -- entering that dose into IREP
21 actually exceeded the 50 percent POC value, and
22 so this case was compensated. The only reason
23 that I identified, let's see, some findings in
24 this particular case was something that Hans
25 discussed in detail earlier, and that was the

1 fact that SC&A is questioning the DCF values for
2 the skin in the implementation guide, the
3 external implementation guide. And he went into
4 great detail about our issues and concerns about
5 these DCF values, and so that was one of the
6 findings in this particular case.

7 Let's see what the second one is.

8 **DR. BEHLING:** The second one is (unintelligible).

9 **MS. BEHLING:** Oh, yes. Yeah, in this particular
10 case it just so happened -- the assumptions that
11 were used by NIOSH in calculating the dose -- one
12 of the assumptions was to use a dose reduction
13 factor of .6, which was applied to -- because of
14 attenuation from clothing. And when we actually
15 went into the Technical Basis Document they also
16 give a more modest dose reduction factor of .8.
17 And one of the other issues was that the dose
18 reconstructor -- he -- he used *The Health Physics*
19 *Manual of Good Practices for Uranium Facilities*
20 as his basis for the dose reduction factor of .6,
21 and I don't believe he actually referenced that
22 in his records, unless he may have made mention
23 of it in the dose reconstruction report. But the
24 other issue is, he -- he could have, more
25 appropriately in our minds, used the Technical

1 Basis Document for Fernald to come up with a dose
2 reduction factor of .8.

3 **DR. BEHLING:** I mean he was overly
4 underestimating the dose --

5 **MS. BEHLING:** Yes.

6 **DR. BEHLING:** -- which is something that is
7 commonly used when you -- really trying to push
8 this to the test and saying will we have to
9 compensate, by either doing a partial or using
10 parameters that are not necessarily claimant-
11 favorable or claimant deliberately unfavorable.

12 **MR. HINNEFELD:** Right.

13 **DR. BEHLING:** But, you know, the -- the reduction
14 factor of .8 versus .6, the TBD offers that as --

15 **MR. HINNEFELD:** Right.

16 **DR. BEHLING:** -- one option and I said well, why
17 did he have to go to another (unintelligible) to
18 come up with this value when the TBD has a value
19 here that he could have referenced that would
20 have been more appropriate. But, you know, it's
21 a nitpicking issue.

22 **DR. ROESSLER:** So what you're saying is instead
23 of using .8, he used .6 --

24 **DR. BEHLING:** .6.

25 **DR. ROESSLER:** -- and still came up over --

1 DR. BEHLING: Yes, uh-huh.

2 DR. ROESSLER: So -- I got it.

3 MR. HINNEFELD: And all these -- and really only
4 considered two of the four cancers.

5 DR. ROESSLER: Yes.

6 MR. HINNEFELD: He had four basal cells --

7 DR. ROESSLER: That's right.

8 MR. HINNEFELD: -- but only two of them were
9 considered in the dose reconstruction.

10 DR. ROESSLER: In the other basal cell cancer,
11 did they use this dose --

12 DR. BEHLING: No, no. It's only for clothing.
13 The eyelids are --

14 MR. HINNEFELD: Eyelids wouldn't --

15 DR. ROESSLER: Yeah, I don't mean this --

16 DR. BEHLING: Unless the guy wore glasses or
17 something --

18 DR. ROESSLER: A different case, there was a guy
19 with a back cancer, an earlier one.

20 MR. HINNEFELD: Yeah. There wasn't any -- I
21 don't think there was any beta dose on that.
22 Wasn't it all photon dose on that?

23 DR. BEHLING: Yeah, I think so.

24 DR. ROESSLER: Okay.

25 MS. BEHLING: Okay. I believe that's it for this

1 case. I got the easy ones.

2 **DR. ROESSLER:** Maybe you're just more efficient.

3 **MR. HINNEFELD:** The meeting goes much quicker
4 when you run things, Kathy.

5 **DR. ROESSLER:** Kathy, there's only two. There's
6 two of our gender here.

7 **MS. BEHLING:** Okay. We're going to go on to tab
8 34, but this I must have been doing late at
9 night. I made -- I got a little overzealous on
10 the checkmarks that I put in my checklist. I
11 think I -- in the version that you got that was
12 originally sent out I think I have eight findings
13 and there's actually only six. And I don't think
14 they're the same findings as what I ultimately
15 came to when I changed some wording. So here's
16 five pages of an errata sheet that I sent to some
17 people. I actually sent to --

18 **MR. HINNEFELD:** Me and Dr. Ziemer.

19 **DR. ROESSLER:** I think -- yes, I've got copies of
20 that.

21 **MS. BEHLING:** I may have sent this out before the
22 meeting also, but I do apologize.

23 **MR. ALLEN:** I got it.

24 **MS. BEHLING:** Okay. It makes it a little bit
25 easier when we go through this case if you have

1 those. Okay.

2 **MR. HINNEFELD:** Maybe I'll just mention that I'll
3 insert these errata sheets in the hard copy that
4 I'm going to provide to Ray so that Ray's version
5 will have the corrected sheets.

6 **MS. BEHLING:** Okay.

7 **MR. HINNEFELD:** Okay.

8 **MS. BEHLING:** Yes. And after this meeting and we
9 come to some resolution on these issues, and
10 we'll be submitting a revised version. And in
11 fact, there was several typographical errors that
12 we found throughout. But this particular case,
13 it makes it so much more difficult to go over
14 this case if you don't have these errata sheets
15 in your hand here.

16 Okay. As I said, this is tab 34. It's case
17 number 014898, and it is again a Fernald site.
18 The individual worked at Fernald from 1954, early
19 time frame, until 1968 and was diagnosed with
20 prostate cancer in 1990. Again, this was
21 considered an overestimation of the dose by
22 NIOSH, and they derived a 35.6 rem dose to
23 prostate, which resulted in a probability of
24 causation of 37.95 percent. The largest
25 contribution of dose was the calculation or the

1 estimate of missed photon dose, which was over 16
2 rem, and then there was also a hypothetical
3 internal dose calculated.

4 Okay. As I said, there were actually six
5 findings as opposed to the eight original
6 findings, and let's see here. Okay. We -- we
7 discussed this several times before, again, and
8 that's the issue of using either the testes or
9 the bladder as the surrogate for the prostate,
10 and I make mention of that on page 9. I don't
11 know that I actually identified that as a
12 finding, but I did make mention that there's an
13 inconsistency between the two guidance documents.
14 So the first finding, 34.1-C.2.2 on page 10 of
15 the errata sheet -- let's see here, inappropriate
16 assignment of missed photon dose. Okay. In this
17 particular case this individual, as I recall, had
18 records, and -- yes, older records seem to be
19 available. And I just felt as I went through
20 this, again, it's this issue of if you have an
21 unknown, then be maximally claimant-favorable and
22 you can overestimate the dose. However, in this
23 particular case the records did exist and I was
24 able to go into those records and actually
25 calculate the number of missed dose cycles which,

1 rather than NIOSH's number of 328 missed
2 dosimetry cycles, I calculated or counted 197.
3 And the difference in missed dose then from the
4 16.3 rem that was calculated by NIOSH would have
5 been 9.8 using the same -- using the same LOD and
6 DCF values as NIOSH used -- for the 197 dosimetry
7 exchange cycles. And again, it's just an issue
8 of -- as the regulations state, when you -- when
9 you know the information, there is no reason to
10 be overly claimant-favorable in this case.

11 **DR. BEHLING:** And let me just interject,
12 sometimes -- we probably would not have even made
13 that an issue if the dose reconstruction -- right
14 now, I'm making an assumption here that he did
15 not, but sometimes they will say a missed dose
16 was assigned for all years during which the
17 person was monitored based on the exchange
18 frequency, independent of whether or not a person
19 had a recorded dose. And so they tell you that,
20 for instance, if six cycles out of this year, a
21 person had a recorded dose, they would still give
22 you 12. And if they state that, then you know up
23 front that that is an intended overestimation of
24 missed dose because they state so. And I'm not
25 sure in this case whether that was done or not.

1 But 320 versus 197, sort of -- I don't know where
2 they came up with that number.

3 **MR. GIBSON:** (Unintelligible)

4 **MS. BEHLING:** Yeah, okay, we discussed this
5 already. Thanks.

6 (Whereupon, Mr. Gibson excused himself from
7 the meeting.)

8 **MS. BEHLING:** Okay. Yeah, and I'm not sure --

9 **DR. BEHLING:** Again, it's claimant-favorable.

10 **MS. BEHLING:** It's claimant-favorable, but --

11 **DR. BEHLING:** The question is, is this an issue
12 that you want to necessarily deal with by
13 correcting something. For efficiency purposes,
14 it's sometimes easier -- rather than to go
15 through each of the data sheets of dosimetry and
16 saying oh, for this year there were -- there was
17 three recorded doses that were positive,
18 therefore missed dose is only 9. And perhaps for
19 efficiency one could argue let's just assume all
20 years and all cycles were basically missed and
21 therefore -- knowing very well that you're going
22 to overestimate and in the process save yourself
23 an hour or two worth of going through the
24 individual records, I can understand the
25 efficiency factor here.

1 **MR. HINNEFELD:** That's probably what was done in
2 this case.

3 **MS. BEHLING:** The second finding has to do with
4 the use of the limit of detection for -- in this
5 particular case, the dose reconstructor used
6 ORAU-TIB-10, which is a complex-wide procedure
7 and assumed a 40 millirem per cycle limit of
8 detection where they -- they should have gone to
9 the site-specific procedure or Technical Basis
10 Document, the Fernald Technical Basis Document,
11 which actually identifies 30 millirem as your --
12 to be used for your LOD for your missed dosimetry
13 cycles. So again, this was an overestimation of
14 the dose, but we just felt it was more
15 technically correct to use the information from
16 the Technical Basis Document.
17 And then finding three, which is finding 34.3-
18 C.4.2, again goes back to this reoccurring issue
19 that we obviously have seen in almost every case,
20 and that's inappropriately assigning uncertainty
21 for the missed photon dose.

22 **DR. BEHLING:** When LOD is used.

23 **MS. BEHLING:** Right, when LOD is used. Exactly.
24 I think we've gone through that enough times now.
25 Okay. And here again, the -- we're going to move

1 on to the on-site ambient dose, and I identify
2 two findings on page 12, that the dose
3 reconstructor failed to account for on-site
4 ambient dose and that they didn't use appropriate
5 procedure for considering the use of on-site
6 ambient dose. Again, I just feel -- looking at
7 the regulations and looking at what's most
8 defensible, the dose reconstructor in this case
9 actually made the statement in the dose
10 reconstruction report that because they used
11 claimant-favorable correction factors for
12 measured and missed photon dose, they decided not
13 to use -- not to calculate an assigned dose -- an
14 on-site ambient dose. And I feel that it would
15 be -- it would have been better -- in fact I
16 cited up-front findings that it --the dose
17 reconstructor could have almost -- just as easily
18 looked at the records, they were clear to me how
19 many missed doses there were, and actually count
20 the correct number of missed doses and then gone
21 into the Fernald -- Fernald does have -- it's one
22 of those facilities that in the early years --
23 since this dose reconstructor (sic) started his
24 employment in 1954, Fernald has a workbook or a
25 spreadsheet I believe that you can go in and very

1 easily put in the years of employment and
2 calculate the on-site ambient dose, which in this
3 particular case I did and it came up to 9.17 rem.
4 And so I just felt it's more defensible and
5 scientifically sound to actually calculate the
6 doses that apply to this particular dose
7 reconstruction in the most appropriate manner.
8 And like I said, although in early cases I said
9 it was a lot of overestimation of dose, in this
10 particular case I feel they should have
11 calculated this on-site ambient dose.

12 Okay. The last --

13 **MR. GRIFFON:** To me, that 9.17 rem -- or 9.71, I
14 forget what you said. Is that for the entire --
15 how long was that individual there?

16 **MS. BEHLING:** '54 through '68, I believe.

17 **MR. GRIFFON:** Is that for that 14-year period?

18 **MS. BEHLING:** Yes. Yes.

19 **DR. BEHLING:** Was it based on a maximum
20 (unintelligible) -- you're placing the person
21 always at the highest location?

22 **MS. BEHLING:** I don't know yet, because we didn't
23 get training.

24 **MR. HINNEFELD:** Workbook training. That's pretty
25 high.

1 **MR. GRIFFON:** That's out of the workbook? Yeah,
2 that's 600 --

3 **MS. BEHLING:** Yes.

4 **MR. GRIFFON:** -- millirem a year.

5 **MR. HINNEFELD:** That's 600 or 700 millirem a
6 year. That's pretty high for a uranium plant.

7 **MR. GRIFFON:** That seems surprising to me to have
8 that high of an ambient dose.

9 **MS. BEHLING:** Yes.

10 **DR. ROESSLER:** So are you saying they really
11 underestimated in this case, that we should add 9
12 to --

13 **DR. BEHLING:** Yes, yes. Yeah, that's the
14 deficiency.

15 **DR. ROESSLER:** -- and with a POC of 38, that --

16 **MS. BEHLING:** However --

17 **MR. HINNEFELD:** It was already about 8 that she
18 took out.

19 **MS. BEHLING:** Yes. What I was going to say is,
20 if you go back to Table 1, the majority of the
21 dose in Table 1 is identified under photon missed
22 dose, which was 16 rem. And I'm suggesting that
23 -- the dose reconstructor really overestimated
24 that dose because --

25 **MR. HINNEFELD:** It should be 7 lower?

1 **DR. ROESSLER:** Oh -- oh, yeah. I see it here.

2 **MS. BEHLING:** Yes. It should have been around --
3 I think I calculated -- what did I say, 9.

4 **MR. HINNEFELD:** I think you said --

5 **MS. BEHLING:** Yeah, about 9 rem.

6 **DR. ROESSLER:** Okay.

7 **MS. BEHLING:** So in one case, I'm -- I'm saying
8 add -- you know, add the 9 rem for the on-site
9 ambient, but to me it's just still something
10 that's more defensible --

11 **MR. GRIFFON:** I guess my question was --

12 **MS. BEHLING:** -- in both cases.

13 **MR. GRIFFON:** -- is that ambient worksheet -- I
14 mean that seems high to me.

15 **MR. HINNEFELD:** Yeah. I wondered where that is,
16 too.

17 **MS. BEHLING:** Yeah. In fact --

18 **MR. HINNEFELD:** Maybe I'll go over that one when
19 I'm over there.

20 **MS. BEHLING:** In fact, I found it interesting
21 also, because initially I -- I wasn't going to
22 delve this far into that on-site ambient, but
23 when I started to look at those worksheets and
24 the site-specific Fernald, there is a Word
25 version write-up up front that talks about how

1 significant the Fernald dose was in the early
2 years. So that's what made me look a little bit
3 deeper and actually calculate what that dose was.
4 Yeah. But it's something hopefully we'll discuss
5 over the next few days of the training.

6 **MR. HINNEFELD:** K65. It had to be close to K65
7 to get anything --

8 **MR. GRIFFON:** Yeah.

9 **MR. HINNEFELD:** -- anywhere close to that, and
10 then it would be --

11 **MR. GRIFFON:** Maybe they assume --

12 **MR. HINNEFELD:** -- badge storage and subsequent
13 subtraction of that, you know, from control. I
14 don't know. I don't know what they did in the
15 '50s. In the early '80s the control badges were
16 kept in the lab. So I don't know what they did
17 in the '50s. There was two in 1954.

18 **MS. BEHLING:** Okay. And if we move on to the
19 internal dose, here again, in this particular
20 case they used the hypothetical internal dose.
21 They did assume 12 radionuclides. They used the
22 colon, even though I guess you can now use -- I
23 think you can use prostate now in -- in the
24 model. But what I wasn't able to do was to
25 reproduce the electron dose with, again, energies

1 less than 15 keV based on the assumptions that
2 were provided in the dose reconstruction report.
3 And again, I used the workbook version 3.03, and
4 I believe I may have gone back to an older
5 version of the workbook that I had, which didn't
6 change anything.

7 **MR. ALLEN:** Oh, I recognize the number. There
8 was an error in an earlier workbook.

9 **MS. BEHLING:** Okay.

10 **MR. ALLEN:** The electron greater than 15 keV, you
11 said?

12 **MS. BEHLING:** Yes.

13 **MR. HINNEFELD:** It's got a (unintelligible)
14 greater than 15.

15 **MR. ALLEN:** There -- there was an error on that
16 12 isotope that added one of those isotopes into
17 the 12, exactly 13 isotopes, one of which did not
18 belong there.

19 **MS. BEHLING:** Okay.

20 **MR. ALLEN:** That's why you can't reproduce it.
21 It was corrected later.

22 **MS. BEHLING:** Okay. In fact, that makes sense
23 because -- well -- yeah, that does make sense
24 because initially the difference between my
25 calculation and their calculation for the

1 electron dose energies greater than 15, NIOSH
2 derived 1.265 rem and my -- my dose came up to
3 .886 rem.

4 **MR. ALLEN:** Sounds about right.

5 **MS. BEHLING:** So that's -- I think that probably
6 accounts for it. So I was using a version where
7 this was corrected.

8 **MR. ALLEN:** Right.

9 **MR. HINNEFELD:** Yeah.

10 **MS. BEHLING:** Okay. That explains it. Okay.
11 Let me just mark this.

12 Okay, and I believe that's all the findings for
13 this case unless anyone has some questions.

14 **MR. GRIFFON:** I just have a question but it's
15 more of on the Fernald site -- I mean the
16 monitoring practices. I'm looking at this
17 person's record, and from '58 to '59 it seems
18 like he went from having like all zeroes in his
19 deep dose to having measurable quantities. Was
20 there --

21 **MR. HINNEFELD:** What was his job?

22 **MS. BEHLING:** I was just going to say --

23 **MR. GRIFFON:** Yeah, I wondered if it was a matter
24 of the work or a matter of the monitoring
25 changing from '58 to '59.

1 **MR. ALLEN:** It's probably the monitoring change.
2 I think it went from like weekly to bi-weekly, or
3 bi-weekly to monthly --

4 **MR. GRIFFON:** So they'd have more --

5 **MR. ALLEN:** -- in that time frame 'cause I think
6 you're right.

7 **MR. GRIFFON:** -- detectable sensor --

8 **MS. BEHLING:** Okay. Yes.

9 **MR. GRIFFON:** Thank you. 'Cause it's 12 periods,
10 yeah. Yeah, you're right.

11 **MS. BEHLING:** Okay. We'll move on to tab 35,
12 which is the Lawrence Livermore National
13 Laboratory site, and it's case number 014627. In
14 this case the energy employee worked from 1975
15 through 2001 and was diagnosed with breast cancer
16 in 2001. She was a member of the administrative
17 staff and NIOSH calculated the dose to the breast
18 of 48.140 rem, and that resulted in a probability
19 of causation of 42 percent.

20 And here again, if you look at Table 1, the
21 biggest contribution of dose came from the
22 estimation of missed photon dose and they also
23 calculated missed electron dose and also there
24 was a hypothetical internal dose calculated.
25 Okay. We identified three findings. The first

1 finding is on page 10, and once again it's that
2 reoccurring theme of an inappropriate method used
3 for estimating missed photon dose where they used
4 that standard correction factor of 2 and then
5 they correct that error by dividing by 2, and
6 then they enter the dose as a lognormal -- or as
7 a median with a lognormal distribution of 1.52.
8 So it's the same -- as you can see, those
9 procedures are troublesome to the dose
10 reconstructors.

11 Okay. Where's finding two here. Okay. We've
12 covered two findings there.

13 The third finding -- again, something we've
14 already talked about -- the hypothetical internal
15 -- the hypothetical intake model. They used the
16 colon to maximize the dose where they could have
17 used the breast as the tissue of interest, which
18 would have reduced the internal dose. And also
19 in this case they selected the 28 radionuclides
20 as opposed to the 12 radionuclides, which I
21 thought would have been more appropriate for the
22 Lawrence Livermore site. And that also would
23 have reduced the dose to, I think -- let's see,
24 it would reduce the dose down to 7.2 rem and --
25 as opposed to 13.7 rem as calculated by NIOSH.

1 Let's see. And I believe that's it for tab 37 --
2 35.

3 **MR. GRIFFON:** You're getting ahead of it.

4 **MS. BEHLING:** Wishful thinking.

5 **MR. HINNEFELD:** Yeah, wishful thinking.

6 **MS. BEHLING:** That's my next -- Hans's turn.

7 **DR. BEHLING:** Okay. Here comes slowpoke again.

8 **DR. ROESSLER:** Don't get defensive.

9 **DR. BEHLING:** Well, I've been insulted
10 (unintelligible) --

11 **DR. ROESSLER:** I can see I'm not riding back with
12 him.

13 **DR. BEHLING:** All right. Next case, tab 36 is
14 case number -- claim number 10920. The
15 individual worked at Pacific Northwest National
16 Laboratory, and the person was there between
17 January of 1977 through February of the year
18 2000. So he was there for 23 years or
19 thereabouts. The Energy employee was an engineer
20 type and he was a senior designer. He was
21 diagnosed with melanoma skin cancer on the right
22 cheek on October 17, 2001 shortly after he
23 terminated his employment. There was an assigned
24 skin dose of 33.5 rem to the -- to the -- cancer,
25 skin cancer, and the POC for that assigned dose

1 was 35.1 percent.

2 Table 1 identifies the general distribution of
3 assigned doses. For photon recorded dose, he
4 only had 100 millirem. The largest dose assigned
5 to him was from missed photon dose, less than 30
6 keV, with 15 rem and also an assigned missed
7 photon dose of an additional 2.6 rem for photon
8 doses in the energy range of 30 to 250 keV. He
9 was given a fairly significant high occupational
10 medical dose, as well as an on-site ambient dose,
11 and also a total hypothetical internal dose of --
12 if you add alpha, photon, electron -- 13.5. So
13 you see that most of the doses assigned to this
14 individual are from the calculated doses that are
15 far in excess of the potential real doses based
16 upon missed dose as well as internal hypothetical
17 dose.

18 For this audit we identified a bunch of noes in
19 our audit response, that if you look at Table 2,
20 there was -- right up front under review of data
21 collection as well as issues involving the CATI
22 report there were a bunch of noes and also cited
23 as potential significant for under review, and
24 we'll explain why that turned out to be the case.
25 In addition to those, there were several other

1 deficiencies which we identified for -- for
2 recorded model photon doses, and those involved
3 electron doses. In total we had nine
4 deficiencies or issues that we wanted to bring
5 up.

6 One of the things that we -- I wanted to just
7 briefly point out -- and again, it's relatively
8 minor -- and that was the issue of how shallow
9 doses are -- are identified. And on page 9 I go
10 through the actual document itself. In the
11 middle of the page we have dose data reported by
12 the DOE, and -- for all the years he worked there
13 was only -- there were only two years in which he
14 received a recorded dose. All others were either
15 zero or non-recorded doses. And so for 1980 you
16 see two values, a shallow dose and a deep dose.
17 And for 1981, again, a -- and for the first year
18 was 30 and 30. For 1981 it's 40 and 10. And I
19 looked at those and then I tried to identify how
20 the entries in the IREP input code for entries
21 one through three were derived, and I had a tough
22 time really understanding it, so I looked towards
23 the bottom. You see at the bottom of page 9 I
24 stated -- based on this explanation NIOSH
25 assigned the following skin doses which are

1 defined in the entries as one, two, and three,
2 and they were also defined as constants. And so
3 you see doses defined in behalf of 30 to 250 keV
4 and less than 30 keV, and these are the reflected
5 doses assigned in the IREP input for the two
6 years, '80 and '81. And I cannot really come up
7 with how these numbers were derived. And again,
8 I sort of go to the Table 3, which I identify on
9 page 11 as the instructions that were offered,
10 historical Hanford recorded dose practices. And
11 -- and you look at those and you sort of say how
12 did they come up with the numbers that they
13 assigned based on the definition for non-
14 penetrating and penetrating doses. And as I
15 said, they're trivial differences, but I really
16 can't quite understand how these numbers that you
17 identify in the IREP code were -- were derived
18 from these values.

19 Also I might want to add that when you look at
20 the Table 3 values and then also go to the -- on
21 page 25 there is a table which came -- which is
22 taken directly out of the DOE assigned doses as
23 an instruction -- you find that they're not --
24 not -- they don't coincide in time when you look
25 at the Table 2 on page 25 and compare that to

1 Table 3 on page 11. They do not match each other
2 in terms of how these dosimeters are to be
3 interpreted with regard to -- to skin dose as
4 opposed to whole body dose over function of time.
5 And then I think sometimes you run into these --
6 these problems where you sort of say well, which
7 procedure should I -- which instruction should I
8 follow. And as you can see, the time frames
9 don't match necessarily. And as I said
10 beforehand, the actual doses are trivial, but
11 it's just a matter of trying to get an
12 understanding of how these doses were actually
13 derived.

14 In addition, we talk about a skin DCF, and I have
15 to say, when -- in this case it didn't matter
16 because they used a dose conversation factor of
17 1, but the fact is when you add penetrating and
18 non-penetrating as defined in those two tables,
19 either Table 3 on page 11 or the other table on
20 page 25, the skin dose is defined as open window
21 plus shielded, let's say, for '44 through '47, do
22 you really need a DCF value? In this case, as I
23 said, it didn't matter because they used --
24 elected to use a DCF of 1. But the truth is, a
25 skin dose is a skin dose, and the concept of a

1 DCF falls by the wayside. The fact that, again,
2 these values were entered as constants as opposed
3 to a -- an arithmetic mean with an uncertainty,
4 again was an issue we've raised in a number of
5 previous cases and, again, these doses were
6 modest so that any uncertainty assigned dose
7 wouldn't have really significantly made any
8 difference. But again, it's just a technical
9 error. I'm on page 12 and these are the
10 findings, 36.3 and 36.4.

11 Under other observations I do point out the issue
12 of something that we've already discussed, and
13 that is what I find is -- is -- are DCF values
14 that I can't reconcile based on the actual
15 numbers. And we won't go into it but, you know,
16 I don't -- I can't understand how the HP-10 dose
17 that's given and the DCF values for AP versus PA
18 are essentially identical. That cannot be, so
19 something is wrong about this whole table in
20 which DCFs were derived based on ICRP data.

21 One of the things that we could not really do for
22 this particular case, and that was explained by
23 DOE, that because of the low doses that he
24 received they only provided an annual summary
25 table, not -- rather than individual monitoring.

1 So it's -- it was essentially impossible for me
2 to determine what the frequency of the monitoring
3 period was, whether it was monthly, quarterly, or
4 whatever. But NIOSH assumed 300 zero dosimeter
5 readings on the assumption that they were -- this
6 individual was monitored on a monthly basis for
7 the full 25 years in question. And then they
8 divided by two photon energies, 30 to 250 and
9 less than 30 keV. Given that, I will give the
10 benefit by saying that okay, in the absence of
11 data, 12 cycles per year does appear to be
12 claimant-favorable and -- and so it certainly
13 would tend to overestimate, if anything else.
14 But I didn't make that as a finding, it's just
15 that the -- the dosimetry DOE data did not allow
16 me to verify whether or not the individual was
17 monitored monthly because they stated in the
18 dosimetry records that for very low doses they
19 simply do not give cycle by cycle readouts. So I
20 can only conclude that this must be a claimant-
21 favorable assumption of 300 cycles of monitoring.
22 On-site ambient, again, I think this is something
23 that we've talked about. It's likely to be
24 trivial, but on-site ambient doses are usually
25 defined by a deep dose, which is very appropriate

1 then when you assign an on-site ambient dose for
2 a person who has a solid cancer. Or you take the
3 HP-10 if you want to do -- take the HP-10 at face
4 value, or you take a DCF value in using maybe
5 perhaps an isotropic geometry. In this case, the
6 cancer in question is skin dose, and therefore
7 the ambient doses, as we see them or as they are
8 recorded, might just underestimate the actual
9 dose to the skin because the on-site ambient
10 doses are deep doses. I assume they're always
11 recorded as deep doses, which means that a skin
12 dose or a skin cancer may be underestimated in
13 circumstances where on-site ambient dose is also
14 in addition to photon exposures includes the beta
15 component or very low energy photon component
16 that wouldn't be captured in the environmental
17 dosimeter that is recorded only by -- by the deep
18 dose. It's not like it's going to be a
19 significant change but, you know, it's just
20 something that I've raised in other instances
21 involving skin cancers since ambient doses are
22 never defined for a -- a 7 millirem dose.

23 **MR. ALLEN:** Shouldn't be a lot of low energy
24 ambient dose --

25 **DR. BEHLING:** Yeah.

1 **MR. ALLEN:** I mean if you're close enough to get
2 that kind of dose, then it's not ambient anymore.

3 **DR. BEHLING:** Well, if it's a plume emersion and
4 it involves certain noble gases that might
5 contain, you know, a beta component, the HP-10
6 dose that is normally recorded as a deep dose for
7 -- for environmental purposes is -- is something
8 that would modestly underestimate the real dose.
9 Audit of internal doses on page 15, let's see
10 here. He assigned internal dose of 13.4 and it
11 corresponds to the colon, which was used as the
12 surrogate for non-metabolic tissue. When we did
13 the calculation for skin, the dose in question
14 turned out to be 8.46 rem, so again the skin is
15 one of those tissues that can be calculated
16 directly without having to rely on a surrogate
17 tissue. Again, the dose is lower, so the
18 assigned dose is clearly claimant-favorable and
19 was also assigned for 28 radionuclides. Let me
20 see here. Does PNNL have reactors that would
21 justify the 28 radionuclides?

22 **MR. HINNEFELD:** We would assume a PNNL person
23 maybe (unintelligible) around reactor --

24 **MR. ALLEN:** Pretty intermingled, so --

25 **MR. HINNEFELD:** Yeah.

1 **DR. BEHLING:** Yeah, I didn't make an issue out of
2 it but I was just asking for -- for own -- my own
3 clarification.

4 **MR. HINNEFELD:** We kind of -- it's a little tough
5 to separate PNNL --

6 **DR. BEHLING:** Yeah, yeah.

7 **MR. HINNEFELD:** -- from Hanford sometimes, so...

8 **DR. BEHLING:** As I said, I wasn't sure and so I
9 didn't make that as a -- an issue at all. But
10 here we have a -- we're on page 16 and the CATI
11 report and radiological incidents. Now here's
12 the situation -- and I think we can talk about
13 this -- where the person in this report claimed
14 that he was injured at one point in time in the
15 middle '90s while he was working on a pipe that
16 ruptured and sprayed him. And apparently he
17 claimed he was -- the injury required first aid
18 treatment, and there is no record of any
19 radiological incidents reported among the DOE
20 records that were filed. And one would normally
21 dismiss it, but according to the claimant it is
22 the exact location where he was subsequently
23 diagnosed with a melanoma. Now on that level of
24 coincidence, one would certainly want to look at
25 this and sort of say was this a radiological

1 incidence that should have been looked at? If it
2 was not a radiological incident, could we at
3 least dismiss it on the basis of information that
4 should have been filed for on-the-job injuries
5 which are well-documented even when they're not
6 radiological in nature. The question is, given
7 the coincidence of an injury that the claimant
8 claims to have sustained and that also being the
9 exact location of a skin cancer warrants somewhat
10 of a closer look that says there is every reason
11 to believe that this happened because of first
12 aid. Perhaps some documentation in the first aid
13 facility where he was apparently treated or, as a
14 minimum, collaborate with -- with coworkers who
15 may have seen this or been witness to this or
16 something. So in essence what I wanted to do
17 here is to say can we in some form or fashion
18 eliminate the likelihood that that melanoma that
19 he had was potentially linked to an injury that
20 happened or didn't happen. Right now I don't see
21 any documentation that would allow you to say
22 categorically one way or the other.

23 **DR. ROESSLER:** What's the latent period for
24 melanoma?

25 **MR. HINNEFELD:** I was just going to say, this

1 one, it would have to get up there pretty high to
2 make a huge difference.

3 **DR. BEHLING:** Yes. There was a relatively few
4 years in between the diagnosis and the --

5 **DR. ROESSLER:** Just six years, and I'm wondering
6 if that's a -- I don't know what it is.

7 **MR. HINNEFELD:** I don't know. I was thinking
8 melanoma acts a lot like a solid tumor, doesn't
9 it?

10 **MR. ALLEN:** Yeah.

11 **DR. ROESSLER:** Be more like 10 to 20 years then?

12 **MR. HINNEFELD:** Well, the -- the risk factor, you
13 know, doesn't just start in all these things. It
14 kind of creeps up.

15 **DR. ROESSLER:** Yeah, yeah.

16 **MR. HINNEFELD:** So it wouldn't necessarily be
17 zero at six years --

18 **MR. ALLEN:** Right.

19 **MR. HINNEFELD:** -- but it would be far below
20 where it would eventually be.

21 **DR. ROESSLER:** Is that entered into the POC?

22 **MR. HINNEFELD:** It's part of IREP, yeah.

23 **MR. ALLEN:** Yeah. Yeah, it's in IREP. Yeah.

24 **DR. BEHLING:** And I assume that the shortened
25 latency period --

1 **DR. ROESSLER:** This wasn't in there.

2 **DR. BEHLING:** -- is considered in IREP in terms
3 of POC.

4 **MR. HINNEFELD:** Yes. Yes, it'd be independent of
5 any dosing we do --

6 **DR. BEHLING:** Yes.

7 **DR. ROESSLER:** Yeah.

8 **MR. HINNEFELD:** -- because that gets sorted out
9 in the IREP application.

10 **MR. ALLEN:** So we could go through a lot of
11 trouble determining a dose that's been multiplied
12 by zero.

13 **MR. HINNEFELD:** Or close to zero.

14 **DR. ROESSLER:** Very close to zero.

15 **DR. BEHLING:** I mean I would just like to see
16 something that says we either confirm or we
17 discredit this claim. You know, I mean I don't
18 want to call anyone a liar, but, you know, after
19 the Wendy's incidence and chili and the finger,
20 you sort of say is this something that you
21 necessarily want to at least look at? You don't
22 want to -- you don't want to call anybody a liar,
23 but if -- if the claim is there, certainly an
24 employee injured on the job is usually well-
25 documented.

1 **MR. HINNEFELD:** You have -- if you got first aid,
2 a lot of places will have it.

3 **DR. BEHLING:** Yes.

4 **MR. ALLEN:** Yeah.

5 **MR. HINNEFELD:** I mean you get their medical
6 record --

7 **DR. BEHLING:** Oh, yes.

8 **MS. BEHLING:** Right.

9 **MR. HINNEFELD:** -- it has every visit --

10 **DR. BEHLING:** And this was '95. This did not
11 happen, you know, in the '60s when here's a band
12 aid, son, get out of here. This clearly would
13 have been documented and -- and I think we
14 should, as a minimum, look at injury reports and
15 -- and if nothing else, if that doesn't exist,
16 say who were the coworkers that supposedly were
17 with you and potentially will have to go on
18 record as saying yes, I concur with --

19 **MR. HINNEFELD:** The outcome of this might be that
20 regardless of what the scrape did to his cheek --

21 **DR. BEHLING:** Yes.

22 **MR. HINNEFELD:** -- the latency period is such
23 that it's just not credible to have an impact.
24 You know, he -- he -- absolutely factual in
25 telling us what happened --

1 **MR. GRIFFON:** Yeah, yeah.

2 **DR. ROESSLER:** Uh-huh.

3 **MR. HINNEFELD:** -- and it just doesn't matter --

4 **MR. GRIFFON:** Right.

5 **MR. HINNEFELD:** -- because not enough time
6 passed. I mean that could be (unintelligible) --

7 **DR. BEHLING:** But, you know, one would still --
8 the probability which -- I mean the short latency
9 period doesn't exclude it. It's just I think
10 with the exceptions of -- I think IREP considers
11 almost every latency period as something
12 contributed to the cancer. I don't know where it
13 stops. Clearly obviously, leukemia have a known
14 short latency period. I don't know about skin
15 cancer, but one could say with horrendous
16 exposures if it was an alpha emitter and locally
17 --

18 **MR. HINNEFELD:** Sure.

19 **DR. BEHLING:** -- and, you know, I wouldn't say
20 no. But I would like to at least say we've gone
21 the distance. We've identified, you know, or we
22 contacted the first aid people. Are there any --
23 any injury reports, are there any people that you
24 recall that supposedly worked with you who will
25 at least stand by your side and say that yes,

1 they remember him being injured and -- and even
2 perhaps identify a location and perhaps a
3 potential source term in terms of the
4 radionuclides. I would just like to see some
5 resolution. Anyway, having -- having that claim
6 made by the claimant, we elected to cite a number
7 of things that ultimately resulted in an
8 uncertainty because we don't know what those
9 could have been possibly without necessarily
10 jumping to conclusions at this point.

11 **MS. BEHLING:** So we marked it as under review.

12 **DR. BEHLING:** Under review.

13 **MR. HINNEFELD:** Yeah, I know what the -- well,
14 the dose -- I know what the dose reconstructor's
15 view was that, you know, we gave him this huge
16 intake --

17 **DR. BEHLING:** Yes.

18 **MR. HINNEFELD:** -- and so on and so forth, and
19 the issue here that is sort of dramatic is the
20 location of the scrape and the location of the
21 melanoma, and so -- yeah. I guess I'd hate to
22 speak for OCAS in terms of will we go do this,
23 but it seems like that might be something we
24 might want to look into.

25 **MR. ALLEN:** As a manner of --

1 **MR. HINNEFELD:** At the very least --

2 **MR. ALLEN:** -- follow-up telephone calls.

3 **MR. HINNEFELD:** -- PNNL can obtain medical
4 records from '95, which many sites can. I would
5 suspect Battelle can. While they may not
6 normally routinely provide them -- each site
7 provides different stuff in response to our
8 routine requests, based upon how they keep it.

9 **MR. GRIFFON:** But as a special request --

10 **MR. HINNEFELD:** As a special request, they might
11 be able to pull it out and send it to us.

12 **DR. BEHLING:** And it was so recent. I know that
13 most employers today would keep very good records
14 on injuries, and they don't have to be serious
15 injuries, but if it required first aid treatment
16 on location it's likely that they do have records
17 that would say no, there is nothing here on our
18 file. Which would certainly, again, put some
19 distance between the claimant's statement and the
20 --

21 **DR. ROESSLER:** I'd like to see what the
22 multiplier is six years after.

23 **MR. HINNEFELD:** Where can I find that, Dave? Do
24 you know?

25 **MR. ALLEN:** Without asking Russ, we can --

1 **MR. GRIFFON:** Yeah, Russ.

2 **MR. ALLEN:** -- input --

3 **MR. HINNEFELD:** We could stick it in IREP and
4 just see what kind of POC you get for rem.

5 **DR. ROESSLER:** Yeah.

6 **MR. ALLEN:** Yeah.

7 **DR. BEHLING:** Vary the time frame, you know, do
8 it at 10-year, 15-year, 6-year --

9 **MR. HINNEFELD:** Give him a rem or a rem a year.

10 **DR. BEHLING:** Let's see what it was, the POC was
11 --

12 **MR. HINNEFELD:** Three years before or six years
13 before.

14 **DR. BEHLING:** -- to see how rapidly it falls off.

15 **MR. ALLEN:** We know '94 is --

16 **DR. BEHLING:** '94, '95 time frame.

17 **MR. ALLEN:** 2001 we've got cancer, so -- we can
18 get his age and stick it all in IREP and see what
19 kind of a dose --

20 **DR. ROESSLER:** They'd have to -- have to bring it
21 up there.

22 **MR. HINNEFELD:** We could do something like that.

23 **DR. BEHLING:** And if it shows that you
24 essentially go -- let's say you put in 20 rads to
25 the skin, 15 years or 20 years ahead and then at

1 6 years it drops off to nothing, then it's an
2 academic question --

3 **MR. GRIFFON:** Right. Doesn't matter.

4 **DR. BEHLING:** -- to even follow through.

5 **MR. ALLEN:** And this guy is not even sure what
6 the exact location was.

7 **DR. BEHLING:** Yes.

8 **MR. ALLEN:** He doesn't even know if it was even a
9 contaminated area.

10 **DR. BEHLING:** You know, there are many unanswered
11 questions. Did the injury even occur? If it did
12 occur, was it an injury that was -- that involved
13 a radiological issue? You know, we don't know
14 any of the answers here, but just the coincidence
15 of the cheek and the -- and the injury sort of
16 raises questions that be resolved.

17 **MS. BEHLING:** Is that it?

18 **DR. BEHLING:** Yeah, I think that's it for this
19 case.

20 **MS. BEHLING:** Okay. I'm going to take the last
21 one, and -- and this is the last one, tab 37,
22 because there were no findings on tab 38. That
23 was a Bethlehem Steel case, and it was a
24 compensable case and so there were no findings
25 there.

1 **DR. BEHLING:** For Bethlehem Steel.

2 **MS. BEHLING:** For Bethlehem Steel on case 38. So
3 we're going to -- tab 37 is the last one. And
4 that's Paducah, and it's case number 010753. And
5 in this particular case the employee worked from
6 1951 through 1953 and was diagnosed with prostate
7 cancer in 1968. He was an instrument specialist
8 and the dose -- NIOSH derived a dose of 18.8 rem,
9 and it resulted in a probability of causation of
10 17 percent.

11 **MR. GRIFFON:** Can you tell me -- as you give the
12 background for this, can you tell me when they
13 started processing in Paducah? I thought it was
14 mid-'53, which would mean he was there prior to
15 any rad contamination.

16 **MS. BEHLING:** It was, because in fact when we --
17 Okay. When we go on to my first line, then we'll
18 --

19 **MR. GRIFFON:** I'm sorry.

20 **MS. BEHLING:** Yeah, that's okay. We'll discuss
21 it because this particular case -- this is
22 interesting because on page 9 they calculated an
23 unmonitored dose for the years '52 and '53, and I
24 put a note in here that no dose was assigned for
25 1951 because Paducah was not yet operational.

1 Okay. But they did calculate for '52 and '53.
2 And the process that they went about -- and this
3 was something we were talking about earlier, how
4 do we go about calculating these unmonitored
5 doses for the various facilities. And in this
6 case, again, they went into the Paducah Technical
7 Basis Document and there was data showing that
8 there were 223 workers monitored with an average
9 exposure of 140 rem associated with those
10 workers, and a maximum exposure --

11 **DR. BEHLING:** 140 millirem.

12 **MS. BEHLING:** I'm sorry, 140 millirem. I'm
13 sorry.

14 **DR. BEHLING:** I smell (unintelligible) here.

15 **MS. BEHLING:** Getting tired, huh? -- with a
16 maximum exposure of 820 millirem. What NIOSH did
17 to assess this or to calculate this unmonitored
18 dose for these two years was to use that maximum
19 exposure of 820 millirem, and then they used
20 maximizing parameters as specified in TIB-10.
21 And those maximizing parameters were they
22 multiplied that dose by a factor of 2, they
23 assumed that the photon energy was 100 percent 30
24 to 250 keV, that it was an acute exposure, and
25 they used an organ dose -- a DCF factor of 1.244

1 which corresponds to the bladder as a surrogate
2 organ for the prostate.

3 **DR. BEHLING:** And that's for the ranking to -- to
4 organ dose conversion.

5 **MS. BEHLING:** Yes. The -- the only issue that we
6 wanted to point out here is the fact that they
7 did use maximizing parameters associated with
8 TIB-10. And I know this sounds like it's
9 nitpicking, but it's a technical issue that TIB-
10 10 is for --

11 **DR. BEHLING:** Post --

12 **MS. BEHLING:** Yeah, it's post-1970 data. TIB-10
13 is written for the late film badge era of 1970
14 and after. And we're just recommending that this
15 -- this -- this is more of a technical flaw that
16 maybe NIOSH can either delete this restriction or
17 provide separate guidance for pre-1970 film badge
18 data.

19 **DR. BEHLING:** Yeah, if -- if you look at the
20 procedures as use this only for late era film
21 badge dosimetry --

22 **MR. HINNEFELD:** Yeah.

23 **DR. BEHLING:** -- and -- and this, of course,
24 occurred in the '50s and so --

25 **MR. HINNEFELD:** Of course it --

1 **DR. BEHLING:** It's not a --

2 **MS. BEHLING:** It's not unreasonable --

3 **MR. HINNEFELD:** It's also for application to a
4 measured dose and this guy didn't have any
5 measured doses.

6 **DR. BEHLING:** Yes.

7 **MS. BEHLING:** Exactly. And it's not that they're
8 unreasonable assumptions, it's --

9 **DR. BEHLING:** No, they're not. It's just that,
10 again, it's a technical limitation that the
11 procedure specifies and says don't use this
12 unless it's for post-'70 dosimetry data involving
13 film. And of course, this is obviously well
14 before 1970, so it's just a technical issue.

15 **MS. BEHLING:** Okay. The second finding is on
16 page 10 and this finding is associated with the
17 occupational medical dose. And this -- this was
18 just an interpretation by us. The finding is
19 inappropriate assignment of occupational medical
20 dose uncertainty, and the reason we felt that way
21 is because when you go into the Technical Basis
22 Document for Paducah they talk about the organ
23 dose equivalents for the lumbar spine examination
24 that are described as, quote, rough first
25 approximations for lumbar spine dose

1 reconstruction in the absence of other
2 information. So we assumed that, based on that
3 information, the values that were provided should
4 be used as a best estimate as opposed to an upper
5 bound estimate and that they should have been
6 entered -- they should have been entered --

7 **DR. BEHLING:** With the 30 percent.

8 **MS. BEHLING:** Right, as a -- as a -- with an
9 uncertainty.

10 **DR. BEHLING:** And standard is the 30 percent.

11 **MS. BEHLING:** Thirty percent uncertainty, which
12 they weren't in this particular case, no. Right.
13 Yeah, entry number 60 of Appendix A shows a
14 lumbar spine dose of 2.9 rem, and it should have
15 been entered with an estimate of uncertainty.

16 **DR. BEHLING:** Again, when you look at that and
17 compare it to the other lumbar spine, which was
18 somewhere around 270 millirem or thereabouts, you
19 realize this is a factor of 10 higher. So this
20 is a very high dose.

21 **MS. BEHLING:** Yes.

22 **MR. HINNEFELD:** Yeah. I don't know where this
23 2.9 came from. I think it has to do with the
24 number of years.

25 **MS. BEHLING:** Okay. And you may be touching on

1 the next issue, which is finding three. It just
2 so happens that we were looking at both the Iowa
3 Technical Basis Document and this Paducah
4 Technical Basis Document. And when you look at
5 the issue of the doses assigned for the lumbar
6 spine based on the guidance provided in those two
7 Technical Basis Documents, the doses are very
8 different. The Technical Basis Document for Iowa
9 recommends a dose of 330 millirem for the lumbar
10 spine associated with colon -- the colon/rectum
11 and it -- for the Paducah, obviously it was -- it
12 was the 2.9 rem and we couldn't -- couldn't --

13 **DR. BEHLING:** Couldn't reconcile.

14 **MS. BEHLING:** Yeah, reconcile why there was such
15 a difference.

16 **DR. ROESSLER:** Does it have anything to do with
17 the date when they would have given it, the
18 technology that's involved?

19 **DR. BEHLING:** No, they were about the same time
20 frame.

21 **DR. ROESSLER:** About the same time.

22 **MR. ALLEN:** Which would have been probably in the
23 '50s, as well, I think.

24 **MR. HINNEFELD:** Our reviewer says there was a
25 difference in the number of years. Iowa's

1 (unintelligible) --

2 **DR. BEHLING:** Yes. I think one was two and the
3 other one was five.

4 **MR. HINNEFELD:** -- Paducah's five, that doesn't
5 account for the total difference, so -- unless
6 you -- I don't know. I'll have to do some more
7 research on, you know, where these things come
8 from. But 2.19 seems pretty high for --

9 **DR. BEHLING:** Yeah, it does.

10 **MR. HINNEFELD:** -- a lumbar spine exam, colon
11 dose for the lumbar spine. Even -- even with
12 five years that sounds kind of high.

13 **DR. ROESSLER:** This says the blood changes at
14 that -- I'm just kidding.

15 **MS. BEHLING:** Okay. And then the final finding
16 on this case is on page 11 and it has to do,
17 again, with the internal dose. And once again,
18 the -- NIOSH selected the colon as -- in
19 calculating their hypothetical internal dose,
20 which resulted in 11.6 rem where -- whereas they
21 could have used the prostate as the organ of
22 interest for calculating the hypothetical
23 internal, which would have reduced that dose to I
24 believe about 10 rem. And again, the issue of
25 they selected the 28 radionuclides for Paducah,

1 which I thought the 12 radionuclides would have
2 been more appropriate because this facility does
3 not have a reactor.

4 **MR. HINNEFELD:** Yeah, the 12 certainly should
5 have been used. What's the -- what worksheet --
6 what's the worksheet use as the target when it
7 comes out for prostate?

8 **MR. ALLEN:** Highest non-metabolic, a lot of times
9 it's --

10 **MR. HINNEFELD:** Heart wall or something?

11 **MR. ALLEN:** Heart wall would be typical.

12 **MR. HINNEFELD:** Because with colon, you get some
13 GI tract contribution. Is that why colon is
14 usually higher? If you're really talking non-
15 metabolic and from the circulating bloods-- you
16 wouldn't use colon because colon is going to
17 overestimate the dose just circulating in the
18 bloodstream.

19 **MR. ALLEN:** And in reality, heart wall is not the
20 greatest because it's a hollow organ. It's got
21 the blood going through it, but it's -- it's only
22 slightly higher than the rest.

23 **MR. HINNEFELD:** Than the rest. Okay.

24 **MS. BEHLING:** I believe that's it.

25 **DR. ROESSLER:** I have a question about the

1 medical X-rays, and I probably just haven't been
2 listening. But the -- when -- when someone has a
3 chest X-ray, then the -- there is a dose assumed
4 to the prostate and the bladder and the knees or
5 whatever. I mean it's a pretty -- does that
6 change over time as the --

7 **DR. BEHLING:** Yes, yes. Collimation and the --

8 **MR. HINNEFELD:** Technology.

9 **DR. BEHLING:** -- filtration, and other factors.

10 **DR. ROESSLER:** Everything, yeah.

11 **DR. BEHLING:** What starts out as a very small
12 dose, ends up as an insignificant dose as a
13 function of time.

14 **DR. ROESSLER:** Okay.

15 **DR. BEHLING:** So for certain cancers such as
16 colon and rectal and prostate and testicular,
17 because they're basically out of the field and
18 with proper collimation and filtration --

19 **DR. ROESSLER:** At about what year does that -- or
20 is it a kind of a gradual?

21 **DR. BEHLING:** Over in --

22 **MR. HINNEFELD:** Different sites have different
23 times. There was a significant change at Rocky
24 Flats in 1970. I happen to know that because
25 that was one of the cases I looked at, that it --

1 and for -- this is probably a bladder. It kind
2 of disappears after 1970. It was like 25
3 millirem in 1970 and then like 1 after that. So
4 any kind of change -- different sites did change
5 at different times, apparently. I've got those
6 tables from the Rocky Flats TBD here I can show
7 you what happened there -- over time there.

8 **MS. BEHLING:** Okay.

9 **MR. HINNEFELD:** Is that it?

10 **MS. BEHLING:** That's it.

11 **MR. HINNEFELD:** Eighteen in one day. We're
12 getting better at this.

13 **MS. BEHLING:** We are. Seventeen.

14 **MR. HINNEFELD:** Oh, I'm sorry. Seventeen.

15 **MR. GRIFFON:** I guess I have one follow-up
16 question going back to --

17 **DR. BEHLING:** Sixteen.

18 **MS. BEHLING:** Sixteen.

19 **MR. HINNEFELD:** We're still getting better.

20 **MR. GRIFFON:** -- that Hanford case 1157, case
21 number 30.

22 **DR. ROESSLER:** We don't know for sure yet,
23 because Mark speaks.

24 **MR. GRIFFON:** No, this is the last little point.
25 I just wanted to see if -- since we said we'd

1 look at some of these issues on this case,
2 anyway. I had a note on this -- on the dosimetry
3 records, too, of -- like in 1972, Hans mentioned
4 these codes, code 58 or 59 I think he said was
5 whole-body. In 1972, as an example, I saw that
6 they noted that code 59, not defined for this
7 year. And it says it in the -- on the sheet
8 itself, not defined for this year. But there --
9 it shows 11 times in that year and they -- and
10 they sum up those doses for that year. So I was
11 unclear if the code is not defined for that year,
12 but then they're going ahead and summing up the
13 doses, what -- what does that tell me.

14 **MS. BEHLING:** What are they assigning that dose
15 to.

16 **MR. GRIFFON:** Yeah. So -- and '72 as an example
17 I have, I saw that in some of the records,
18 though, where they -- it said code -- it would
19 say code so-and-so, and then the next column over
20 would be a comment saying this code is not
21 defined for this year.

22 **DR. BEHLING:** Yeah. They change codes though,
23 every year.

24 **MR. GRIFFON:** And then they went ahead -- it
25 looked like to me they went ahead and used it.

1 Now I -- you know, it is a -- I'm looking at some
2 of the other calculations over time change for
3 the dosimetry, so I'm not that familiar with it,
4 but I'm just laying it out there as a question.
5 If these codes weren't defined --

6 **MR. HINNEFELD:** This is case --

7 **MR. GRIFFON:** -- wouldn't that have -- wouldn't
8 that have flagged it when you were going through
9 this data.

10 **MR. HINNEFELD:** Case 1157, is that the case?

11 **MR. GRIFFON:** Yeah, 1157. Number 30.

12 **MR. HINNEFELD:** Yeah.

13 **MR. GRIFFON:** And that's something we --

14 **MR. ALLEN:** I've got the 1972 here. I can tell
15 you what doses they used.

16 **MR. GRIFFON:** Yeah. Do you see the column I'm
17 talking about? Oh, you've got the --

18 **MR. HINNEFELD:** He's got the -- he's got the
19 worksheet.

20 **MR. GRIFFON:** Spreadsheet, yeah.

21 **DR. BEHLING:** You know, they --

22 **MR. GRIFFON:** I'm talking about the DOE record,
23 maybe we can all get -- take a look at that
24 tonight if you have a chance.

25 **MR. HINNEFELD:** Yeah, I can pull it out.

1 **MR. ALLEN:** Let me go grab that.

2 **MR. HINNEFELD:** Yeah, why don't you go grab it.
3 Print -- print a bunch of them, 1157.

4 **MR. GRIFFON:** I don't know if he wants to print a
5 bunch of them. The DOE records themselves --

6 **MR. HINNEFELD:** Well, he can print the page.
7 Yeah, sometimes we get hundreds of pages of
8 responses.

9 **MR. GRIFFON:** That was it. I just -- that's it.

10 **MR. HINNEFELD:** It strikes me that there was a --
11 ORAU team has provided some training to various
12 people, dose reconstructors, on the records from
13 certain sites. And I think they probably
14 provided something on Hanford where they -- you
15 know, they have gone back to say these are --
16 this is what the records looked like from
17 Hanford, and they change over time. And they --
18 and these are the columns, and these are what the
19 various codes mean and things like that. Now to
20 the extent that, you know, some of the site
21 profiles might explain those things relatively
22 well and some might not, so there seems to be
23 knowledge available that's not necessarily
24 captured in the site profile about what -- how to
25 interpret those records. So I don't know exactly

1 where those training materials are or things like
2 that.

3 **MS. BEHLING:** Yeah.

4 **MR. GRIFFON:** I guess -- I guess, what, you know,
5 what I keep falling back to is, you know, it's
6 pretty easy to follow what -- what you do with
7 the data, albeit we haven't walked through the
8 worksheets that well. I've tried on my own
9 sometimes and I've stumbled a -- you know,
10 there's some -- there's a learning curve there,
11 but it's pretty easy to follow those
12 categorizations. But -- but one thing I think we
13 have to reflect back on constantly is we're
14 starting with a -- we're starting with the
15 assumption that all these numbers are correct.
16 And based on -- I mean -- and I think from my
17 standpoint I just want to know how they arrived
18 at some of these numbers in these nicely-formed
19 columns of years of deep dose exposures. I mean
20 if -- if -- I think -- and I'm sure someone on
21 your team has gone through all this, but I think
22 we need to be able to look at that and make sure
23 we -- and Hans probably knows better than I. But
24 I'm just trying to get a level of -- level of
25 comfort with that.

1 **DR. BEHLING:** For instance --

2 **MR. GRIFFON:** Did they handle these and, you
3 know, --

4 **DR. BEHLING:** Well, once you started with the
5 five element multi-purpose dosimeters and they
6 developed an algorithm -- now, an algorithm is
7 really site-specific or the -- the radiologic
8 condition-specific because what applies to one
9 location in terms of an algorithm will not apply
10 to another. I mean that is very, very, very
11 specific to a condition. And I mentioned to you
12 I believe when we were at Three Mile Island we
13 had different algorithms defined for defining the
14 radiation doses for Unit -- the damaged Unit 2
15 reactor versus 1. And because of the high beta
16 component that was there due to contamination and
17 -- and external contamination that was not
18 confined to tanks and pipes and so forth. So an
19 algorithm is not a single algorithm, but one that
20 you've got to define for a radiological
21 environment. And of course when you go from one
22 site to -- or a DOE site where in one location
23 you may have a photon dose that is dominated by a
24 very low energy photon like americium 241, you
25 can't use that algorithm and compare that to a

1 production reactor, you know, that's clear. So -

2 -

3 **MR. GRIFFON:** Well, that's what I'm saying. We
4 spend a lot of time assessing what went on with a
5 number after --

6 **DR. BEHLING:** Yeah.

7 **MR. GRIFFON:** -- it was taken as --

8 **DR. BEHLING:** Is the number correct though?

9 **MR. GRIFFON:** What were the dose conversion
10 factors, or were they, you know, organ dose
11 conversions. But all that, what went into making
12 that number is what I want to look at or closer
13 understand that. I'm sure you guys have done
14 that, but --

15 **DR. BEHLING:** I mean it was simple during the
16 times when you had a film dosimeter, you had an
17 open window and you had a shielded, and you
18 realized that a -- a film only responds to low
19 energy based on the high z material of silver
20 halide, silver bromide. But when you get to the
21 multi-element TLDs in later years, those
22 algorithms had to be defined for a radiation
23 field to know --

24 **MR. ALLEN:** I grabbed the whole dose record here.

25 **DR. BEHLING:** -- what it is, and it is not the

1 same for a very wide range of photon fields.

2 **MR. GRIFFON:** You got the whole DR record. I
3 forgot to bring that case 'cause I had reviewed
4 that one. That's the one I've got on a disk at
5 home.

6 **MR. ALLEN:** The -- I've got all the DOE records
7 that we had.

8 **MR. GRIFFON:** Yeah, that's the file I want.

9 **MR. ALLEN:** I printed off some of the summary
10 stuff. Is this --

11 **MR. HINNEFELD:** Does the sheet you're looking at
12 look like any of these?

13 **MR. GRIFFON:** No, no.

14 **MR. HINNEFELD:** Okay. I guess --

15 **MR. GRIFFON:** The page is --

16 **DR. BEHLING:** Those are the summary sheets for
17 (unintelligible).

18 **MS. BEHLING:** I believe he's looking for these,
19 okay?

20 **MR. HINNEFELD:** Oh, okay.

21 **MS. BEHLING:** Mark?

22 **MR. GRIFFON:** Yeah, yeah. Yes.

23 **DR. BEHLING:** Because here they give you --

24 **MR. GRIFFON:** For different years they look a
25 little different.

1 **DR. BEHLING:** This is obviously is 1974 when the
2 multi-purpose dosimeter was used and you have
3 your five elements and then you have your --

4 **MS. BEHLING:** What year?

5 **MR. GRIFFON:** I know page 41 in that document, if
6 you're -- has this 1968 issue that I was talking
7 about, and then not too far after that is 1972
8 stuff, so --

9 **DR. BEHLING:** Page 41.

10 **MR. GRIFFON:** -- 41 should start it.

11 **MR. ALLEN:** That's 1968. Looks like those go in
12 a different file, probably.

13 **MR. GRIFFON:** Right. Go -- maybe go down like on
14 the next page -- yeah, here. That's it. That's
15 it. Those are some of the ones I was wondering
16 about when you had -- you have negative values.
17 When you add up every -- they cancel each other
18 out, so I know there's something going on.

19 **MR. ALLEN:** Well, we had a hard code of 3, I
20 suspect that's -- it looks like they're -- it's
21 the same date for four readings in a row.

22 **DR. BEHLING:** Well, some will be finger rings.

23 **MR. ALLEN:** This guy did have extremity --

24 **MR. GRIFFON:** Right.

25 **MR. ALLEN:** Let's see, 1968.

1 **MR. GRIFFON:** I don't -- I don't know that we
2 even need this transcribed if you want to close
3 out and we can look at this. I mean I --

4 **MR. HINNEFELD:** Okay. Then we'll wrap up the --

5 **MR. GRIFFON:** Do we need it, Jim? I don't think.
6 Yeah, we're just --

7 **MR. HINNEFELD:** -- the transcribed portion of the
8 meeting then, and then we'll go ahead and have an
9 off-line discussion on --

10 **MR. GRIFFON:** Yeah, that's fine.

11 **MR. HINNEFELD:** -- this record's interpretation
12 thing, if that's okay with you guys.

13 (Whereupon, the recorded portion of the discussion concluded a

C E R T I F I C A T E O F C O U R T R E P O R T E R**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 May 31, 2005; 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 20th day of July, 2005.

STEVEN RAY GREEN, CCR

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