

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

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON
RADIATION AND WORKER HEALTH

Y-12

The verbatim transcript of the Working Group Meeting of the Advisory Board on Radiation and Worker Health held at the Cincinnati Marriott Airport, Hebron, Kentucky, on May 18, 2006.

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

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

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RUTHERFORD, LAVON, NIOSH
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WOLFF, ALBERT W., ORAU

P R O C E E D I N G S

(9:40 a.m.)

WELCOME AND OPENING COMMENTSDR. LEWIS WADE, DFO

1 **DR. WADE:** This is Lew Wade and this is a working
2 group -- a meeting of the working group of the
3 Advisory Board. This is the working group
4 chaired by Mark that's staffed ably by Mike,
5 Robert and Wanda that look at a variety of
6 issues including individual dose reconstru--
7 site profile reviews. And they've gone from
8 work on the Y-12 site profile to the Y-12 SEC
9 petition. And that's the topic that we're here
10 to discuss today is the Y-12 SEC petition. And
11 I'd like to identify who's on the phone
12 starting with Board members. Mike, I know
13 you're with us.

14 **MR. GIBSON:** Yes.

15 **DR. WADE:** Are there any other Board members on
16 the phone?

17 (No response)

18 **DR. WADE:** Okay. Again, we need to keep our
19 eye on producing a quorum, but I don't think
20 that should be an issue at all. Robert will

1 not be joining us today. He's, you know,
2 having some health issues. Robert is also
3 conflicted on Y-12 so if he were to be here he
4 could listen but not actively participate. It
5 might be worthwhile identifying who's on the --
6 the -- who's around the table here, who's on
7 the phone, and then I'll ask the principals to
8 go through and identify if they have particular
9 conflicts relative to this site and then we can
10 begin our deliberations. Around the table this
11 is Lew Wade, the designated federal official
12 for the Board.

13 **MR. GRIFFON:** Mark Griffin with the Advisory
14 Board, chairing this work group.

15 **DR. MAKHIJANI:** Arjun Makhijani, SC&A, no
16 conflict.

17 **MR. RUTHERFORD:** LaVon Rutherford, NIOSH.

18 **DR. NETON:** Jim Neton, NIOSH.

19 **MS. MUNN:** Wanda Munn, Advisory Board. No
20 conflict in Y-12.

21 **MS. HOWELL:** Emily Howell, HHS.

22 **MR. FITZGERALD:** Joe Fitzgerald, SC&A.

23 **MR. MCFEE:** Matt McFee, ORAU team.

24 **MR. WOLFF:** Albert Wolff, ORAU team.

25 **MR. ADLER:** Tim Adler, ORAU team.

1 **MR. KERR:** George Kerr, ORAU team.

2 **DR. WADE:** Now, if I could ask if you're on the
3 phone who -- who wishes to identify themselves to
4 identify themselves. You don't have to but
5 certainly if you intend to participate in the
6 call I'd like you to identify yourself now.

7 **MS. BRACKETT:** Liz Brackett from the ORAU team
8 and I have a conflict with Y-12.

9 **DR. WADE:** Okay.

10 **MR. KOTSCH:** Jeff Kotsch with Labor. I'll be
11 in and out.

12 **DR. WADE:** Welcome. Anyone else on the phone
13 who wishes to identify themselves as a
14 participant?

15 **MR. CHEW:** This is Mel Chew, Dr. Wade. And I
16 do not have a conflict with Y-12.

17 **DR. WADE:** Welcome.

18 **MR. RICH:** This is Bryce Rich. I do not have a
19 conflict.

20 **DR. WADE:** Welcome.

21 **MR. GIBSON:** Lew, this is Mike. I have no
22 conflict.

23 **DR. WADE:** Okay. Why don't we start now and
24 ask Jim as the -- the -- the leader of the
25 NIOSH contingent to identify his team, and if

1 there are people around the table with
2 conflicts we need to hear that.

3 **DR. NETON:** Right. Yeah. This is Jim Neton.
4 I don't have a conflict with Y-12 and I'll ask
5 the -- well, LaVon Rutherford is here as SEC
6 team leader from NIOSH.

7 **MR. RUTHERFORD:** And I have no conflict.

8 **DR. NETON:** And I'll ask the four ORAU folks
9 starting with Matt McFee on the left to
10 identify if they're conflicted or not.

11 **MR. MCFEE:** I am not conflicted with Y-12.

12 **MR. WOLFF:** Al Wolff and not conflicted with Y-
13 12.

14 **MR. ADLER:** I am conflicted with Y-12.

15 **MR. KERR:** George Kerr. I'm not conflicted.

16 **DR. NETON:** Just for the record, Al Wolff is
17 the document owner of the Y-12 document. Tim
18 Adler is the subject expert on the document as
19 is George Kerr.

20 **DR. WADE:** The document owner for the SEC
21 petition evaluation --

22 **DR. NETON:** No, no, no. No. For the report.

23 **DR. WADE:** For the report? Okay.

24 **DR. NETON:** I'm sorry. Yeah.

25 **DR. WADE:** Arjun, your -- your folks?

1 **DR. MAKHIJANI:** This is Arjun Makhijani. I
2 have no conflicts on Y-12.

3 **DR. BEHLING:** Hans Behling. I'm not
4 conflicted.

5 **MR. FITZGERALD:** And Joe Fitzgerald. I'm not
6 conflicted with Y-12.

7 **DR. WADE:** Okay. I think that's all of the --
8 the preliminary business so I'll turn it over
9 to -- to the chair to conduct the
10 deliberations.

11 **INTRODUCTION BY MR. GRIFFON, CHAIR**

12 **MR. GRIFFON:** All right. I think what -- the
13 best way to proceed, I sent a -- a mini-agenda
14 out. I think most of you got that. Everybody
15 probably has that except for me. I pulled it
16 out of the conference -- oh, here we are. I
17 just took it out of the conference call notes.
18 There was a conference call on May 9th, between
19 NIOSH and SC&A and this was an informal
20 conference call. It wasn't a work group call.
21 Mainly it was to go through the -- the -- some
22 of the technical issues in preparation really
23 for this work group meeting and for the
24 upcoming Board meeting. And these were really
25 the -- the remaining issues that were discussed

1 at that meeting and we're going to carry
2 through that agenda here. I think that makes
3 more sense. So just to go down the list, and
4 I'll probably call on Jim and -- and SC&A as we
5 usually do it. I think one thing that -- that
6 we all recognize is that we received quite a
7 few documents, many of them short as you said,
8 Jim, but still quite a few documents last night
9 so there may be, you know -- I don't think any
10 of us have had much time to digest those if any
11 time to even look at them. But at least you
12 can present them here and we'll -- we'll go
13 from there I guess.

14 **DR. MAKHIJANI:** Some of us -- actually I think
15 you just sent them to John and --

16 **MR. GRIFFON:** Yeah.

17 **DR. MAKHIJANI:** -- because I didn't --

18 **DR. NETON:** I sent them to the team. Maybe --

19 **DR. MAKHIJANI:** I didn't receive them. I know
20 they came from --

21 **DR. NETON:** Well, I have copies here so -- and
22 -- and they are short and I apologize for a
23 late delivery but as -- as we talked about it's
24 --

25 **DR. MAKHIJANI:** I don't think --

1 **MR. GRIFFON:** You did the best you could.

2 **DR. MAKHIJANI:** I think -- well, I'm not
3 blaming John.

4 **DR. NETON:** Okay. Well, I have copies. I
5 recognized that they might not get distributed.

ISSUE 1: EXTERNAL DOSE DATA VALIDATION

6 **AND COWORKER MODEL**

7 **MR. GRIFFON:** So just to start off, Issue 1
8 from the conference call. And this is the
9 external dose validation along with the co-
10 worker model and I guess two pieces that we
11 want to discuss there but -- but I guess the
12 primary -- primary remaining issue was the sort
13 of pre-'56 external dose, the questions on the
14 data reliability there. I think Jim is handing
15 out some documents that were emailed --

16 **DR. NETON:** Right.

17 **MR. GRIFFON:** -- yesterday, yeah, so maybe you
18 can --

19 **DR. NETON:** I only made nine copies so share
20 among --

21 **MS. MUNN:** You can -- I have --

22 **DR. NETON:** Okay. Wanda -- Wanda printed hers
23 out. That's good. Okay. Did you turn it over
24 to me, Mark? I was kind of busy distributing.

25 **MR. GRIFFON:** Yep.

1 **DR. NETON:** Sorry.

2 **MR. GRIFFON:** You're all right.

3 **DR. NETON:** What I -- What I just handed out
4 and -- and I apologize. I don't have quite
5 enough copies but -- is -- is a summary. And
6 again this is a last, late breaking issues in -
7 - in -- late breaking summaries of issues that
8 we put together in the last day or two. But I
9 -- I've tried to summarize where -- where we
10 are with this 19-- external doses prior to 19--
11 essentially 1957. I think the -- the issue has
12 -- has -- has arisen that, you know, SC&A and
13 the Advisory Board working group have -- have
14 questioned our ability to reconstruct external
15 doses in the '48 to '56 time frame. A lot of
16 it centers around -- there's two pieces here.
17 One is the validation of the data that we have.
18 And then the second piece is is the
19 extrapolation model that we're proposing to use
20 sufficiently bounding, given those data. So
21 I'll just go through these briefly. The --
22 The first one you have in front of you is a
23 one-page document that we were asked to go back
24 and look at some -- for some additional
25 validation of what's in the CER database

1 compared to, you know, health physics reports
2 and whatever -- whatever we could get a hand
3 on. If you recall in the external area I think
4 we were only able to come up with one
5 validation using Delta View. So this is a -- a
6 brief summary that Bill Tankersley put together
7 that compares the results that were included in
8 a 1957 memo that talked about external doses
9 for 1956. And what it shows here is dose
10 ranges and the number of doses -- number of
11 workers with doses in those ranges in the memo.
12 And you can see the second column refers to
13 skin doses and -- in the memo and the fourth
14 column talks about penetrating doses. And when
15 we compare the skin dose in the memo to the
16 skin doses in the database and penetrating
17 doses in the memo and penetrating doses in the
18 database, one can see that there's a fairly
19 good concordance between the two numbers.
20 Where there are discrepancies there are more
21 data available in the CER database, more --
22 more people in those ranges than -- than in the
23 memo. But we feel that's a -- a -- a pretty
24 good comparison at that point. And then we --
25 the second set was the average doses, millirem

1 per week by department-specific comparison
2 between a memo that was issued in '58 for doses
3 that were 19-- for 1957. And again pretty I
4 would say reasonable agreement between the two,
5 the database and what was included in the memo.
6 They aren't -- They aren't perfect and I'd
7 like to talk a little bit down the line as to
8 why those numbers might not be perfect and to
9 show you what we discovered in the -- in the
10 intervening weeks from Board meeting 'til now.
11 So you might hold your questions on why there
12 are any discrepancies until I can get into some
13 of the meat of the issues. The second -- The
14 second page has a -- a copy -- by the way, some
15 of the information I've handed out does include
16 Privacy Act information so please treat it as
17 such. If you're not comfortable taking it home
18 and disposing of it just give them all back to
19 me and I'll -- I'll take care of it. And --
20 And we certainly shouldn't be reading anybody's
21 names and badge numbers off of these things
22 because we are creating a public record here.
23 Okay. The second memo is a July -- the second
24 page shows a July 1st, 1957 memo in -- in which
25 they attempted to reconstruct what the

1 cumulative exposures were for workers in -- in
2 a foundry operation from 1952 to 1956. So
3 anyone who was on the books in '57, they tried
4 to figure out what their total exposure to date
5 was from working from '52 to '56 or whatever
6 years they happened to be working in -- in
7 those -- in those years. And on the next page
8 what you'll see is a -- a checklist -- I think
9 there are 65 workers listed here -- of the
10 years that the worker was actually involved in
11 operations and -- and had badge results, and a
12 column that shows what the -- what the site
13 believed in this memo to be the total exposure
14 through 1956, and what the average annual
15 exposure was. You can kind of ignore that.
16 They're trying to get a handle for what the
17 average exposures, but what we're more
18 interested here is the total exposures through
19 1956. I should point out I believe that this
20 is shallow dose reported, S-millirem to user
21 nomenclature.

22 **MR. GRIFFON:** I'm assuming that was in the memo
23 somewhere or -- because that's what I was
24 trying to figure out, which time to compare it
25 to.

1 **DR. NETON:** Where -- Where did I -- where did
2 I come to that conclusion and I'm --

3 **MR. GRIFFON:** Yeah.

4 **DR. NETON:** As listed averages --

5 **MR. GRIFFON:** I imagine you're right. Just --
6 Just by the numbers I imagine you're right.

7 **DR. NETON:** All right.

8 **MR. GRIFFON:** By the numbers I thought you were
9 --

10 **DR. NETON:** Yeah. They -- They -- They --
11 They certainly should be S-millirem. If you
12 look at the --

13 **MR. GRIFFON:** Right.

14 **DR. NETON:** -- at the cumulative exposures here
15 they're fairly large and it's a uranium
16 foundry.

17 **MR. GRIFFON:** Yeah.

18 **DR. NETON:** And in my estimation it would be
19 extremely difficult to get those kind of
20 external exposures but --

21 **MR. GRIFFON:** Right.

22 **DR. NETON:** -- but it was a good question,
23 Mark. Again I apologize. Some of this is just
24 so late breaking that I'm -- I'm sort of going
25 through this on the fly a little bit myself.

1 The -- The -- The Excel spreadsheet table
2 behind that documents the comparison of the --
3 of the doses that were in the cumulative doses
4 through '56 in the memo versus what was added
5 up for the doses that we had in the database.
6 And of course, if you recall the database was
7 quarterly doses that, you know, were added up
8 to get a year and then we added up those years
9 through '56 of what we had. This is not
10 perfect agreement. I think in about 90 percent
11 or almost 90 percent of the cases the agreement
12 is pretty good, down in the single digit
13 categories. But you'll find that there are 40
14 percent discrepancies for a large number -- not
15 a large number -- I think six or so of the
16 cases. And if you'll -- if you'll look at it
17 closer -- I've had a chance to look at it where
18 you haven't -- the 40 percent discrepancies are
19 for people who were monitored only in 1952 for
20 the most part so there -- there are some issues
21 there with what occurred maybe in 1952. What
22 I've done though is on the -- after the
23 spreadsheet I've just generated a plot of the
24 comparison of the CER database against the
25 health physics reports, and, you know, of

1 course if -- if it's a pretty good straight
2 line which is what you'd hope, I did discount
3 one data that was a 70 percent discrepant data
4 that Bill Tankersley is working on that he
5 believes was an -- was an incident where a
6 person intentionally got irradiated doing --
7 using some X-ray process. So I'll -- I'll put
8 that caveat on it. But with that exception
9 this is all the raw data that we had. So there
10 are 64 points plotted here. And, you know,
11 again it's not perfect but this certainly shows
12 that we've got a -- a fairly one to one
13 correspondence between what's in the database
14 and what -- what is in the record.

15 **DR. MAKHIJANI:** This doesn't include the ones
16 with the 40 percent --

17 **DR. NETON:** This does.

18 **DR. MAKHIJANI:** It does?

19 **MR. GRIFFON:** It doesn't include the 70
20 percent.

21 **DR. NETON:** It doesn't include the -- the one
22 70 percent outlier I didn't put on here. I
23 probably should have indicated that but -- but
24 the 40 percenters were on there. Again it's --
25 it's not perfect but again it shows, you know,

1 for 50-year-old data that we've got a pretty
2 good handle at least on the magnitude within a
3 reasonable approximation of what these
4 exposures were. So that's where we are with
5 additional comparisons. You know, not a lot of
6 new stuff but, you know, again we -- we've --

7 **MR. GRIFFON:** Yeah.

8 **DR. NETON:** -- managed to glean a couple more
9 supporting pieces of data. I'd like to shift
10 our attention then, if there's no questions on
11 that, to the so-called back extrapolation model
12 and how this might be used given the quality of
13 the data that we may or may not have to bound
14 exposures to workers prior to 1956. Okay, so
15 the next page --

16 **MR. GRIFFON:** Did we say we didn't have
17 questions on that?

18 **DR. NETON:** Oh, I'm sorry. I'm -- I'm --

19 **MR. GRIFFON:** If you could stop there just for
20 a second.

21 **DR. NETON:** Go ahead. I'm sorry.

22 **MR. GRIFFON:** I mean if the graph is
23 interesting, what you can do with the graph is
24 interesting.

25 **DR. NETON:** Yeah.

1 **MR. GRIFFON:** The -- I'm trying to look and
2 see, I mean on the fly here but it seems like
3 most of the differences in your difference
4 column are in the positive side meaning that
5 the --

6 **DR. NETON:** Right.

7 **MR. GRIFFON:** -- hard copy was higher than the
8 --

9 **DR. NETON:** Yes.

10 **MR. GRIFFON:** -- so if they tend to be --

11 **DR. NETON:** Internal but within about 10/15
12 percent.

13 **MR. GRIFFON:** But in most of them you're saying
14 during that '52 year. And is that related to
15 that memo where the doses apparently were --

16 **DR. NETON:** No, that was a 1954.

17 **MR. GRIFFON:** That was a different thing?
18 Okay. That was interesting though --

19 **DR. NETON:** Well --

20 **MR. GRIFFON:** -- as well -- I'm sure you're
21 going to bring that up.

22 **DR. NETON:** Yeah. Well, I can get into that a
23 little bit now. At the end of this -- I won't
24 -- I won't go over these in detail but the last
25 ten or twelve pages that I've included in this

1 handout are internal company correspondences
2 primarily by the health physics folks, Matt Hap
3 West and others. In a 1956 -- '51 -- '58 time
4 frame which sort of document what was going on
5 in the early years. And maybe I'll take the
6 opportunity since you brought it up to -- to
7 explain a little bit at this point. This is an
8 interesting story. There's always a story
9 behind the story in a 60-year-old document.
10 Prior to February 28th, 1955 -- this is
11 interesting. I had -- I had not realized this
12 having been in health physics for a -- more
13 than a quarter of a century -- that prior to
14 1955 the skin dose and the deep dose limits
15 were identical. In other words, they were both
16 15 rem.

17 **MS. MUNN:** Yeah, I noticed that.

18 **DR. NETON:** And -- And so what that meant --
19 and -- and George -- George Kerr has mentioned
20 this several -- in several discussions but it
21 just sort of dawned on me, you know, the
22 implications of this is that given that the
23 skin dose and the shallow -- the skin dose and
24 the shallow -- the skin dose and the deep dose
25 limits were equivalent, there was no incentive

1 on their part necessarily to track them
2 independently.

3 **MS. MUNN:** Unh-unh.

4 **DR. NETON:** In other words, you'll look.
5 There's a memo in here that talks about the
6 beta gamma column. So they would put dose
7 information in the beta gamma column and it
8 didn't really matter whether it was beta or
9 gamma because they were still comparing it
10 against the 15 rem dose limit which applied to
11 both working systems. So what you'll see in
12 these other memos is an attempt on management's
13 part, and particularly health physic's
14 management's part over the years to tease those
15 pieces of information apart and put them in the
16 right locations. Because if -- after '55 then
17 you started getting into the later years into
18 this 5 x N - 18 requirement which, you know,
19 limited dose to a certain cumulative exposures.
20 And so they really felt a need to start to get
21 a better handle. So what I'm -- the bottom
22 line of that is that you would not necessarily
23 expect these memos to agree with the CER
24 database perfectly because the CER database was
25 updated periodically in response to these new

1 requirements to -- to more accurately reflect
2 what the workers were exposed to than some of
3 these sort of contemporaneous memos that were
4 generated on the pro-- snapshots of programs at
5 the time. So if one took a 1954 memo, you may
6 indeed see a discrepancy between skin dose and
7 deep dose because they may have been added into
8 the same column and then later on in the CER
9 database per these memos they may have been
10 teased apart. In fact there's a memo in here
11 where like 50 or 60 workers -- they said these
12 workers were exposed primarily to deep dose.
13 Move their beta gamma column over into the deep
14 dose. So there have been some shuffling of the
15 information over the years and that's
16 essentially what -- and George can back me up
17 if -- if there's anything I'm missing here but
18 that's sort of what -- what's happened prior to
19 February 28th, 1955 when the skin dose limit
20 actually went up. I mean I think it went up to
21 30 rem. I -- I don't recall exactly but -- so
22 the -- the skin dose when it went up. So then
23 there was an incentive on their part to track
24 these -- those calculations separately. So
25 even given that though, you know, this graph --

1 and I understand what Mark is saying. You --
2 especially when a graph -- you show especially
3 when it's on a large scale -- but it does show
4 that it's a, you know -- we -- we have a pretty
5 good snapshot of what the range of doses were
6 for these workers in those time frames. That's
7 -- I think that's what we're trying to say.
8 Now, let me -- let me expand the story a little
9 more here. On top of the fact that prior to
10 '55 the beta gamma columns were -- the beta and
11 gamma were -- were some tracked -- not tracked
12 separately, in 1950 and 1951 -- prior to 1960
13 all badges were exchanged on a weekly basis.
14 So you've got 52 potential reads a week and
15 there's a 30 millirem detection limit about,
16 depends on the year, but 30 to 50 millirems so
17 you've got a lot of missed dose. In 1950 and
18 '51 it was the policy and it's in this Hap West
19 memo that's listed here. Okay. It was the
20 policy that any badge that was not positive was
21 recorded as zero. So this explains why '50 and
22 '51 are zeros for deep dose because it's pretty
23 hard to get that kind of deep dose in a uranium
24 worker. In fact, to flesh out the story a
25 little bit more, most of the doses in '50--

1 almost all the -- all the -- all the doses in
2 '50/'51 do not include the cyclotron workers.
3 It's another -- another part of the puzzle. So
4 you got '50 and '51 showing essentially all
5 zeros because the workers who were monitored,
6 their doses on a weekly basis were less than
7 say 30 millirem a badge exchange cycle which
8 would give them a maximum missed dose of say
9 100 -- 50 to 100 millirem if they were
10 monitored every week during that year. So we
11 know that in '50 -- '50 and '51. '52 and '53
12 the practice changed.

13 **MR. GRIFFON:** So then there's ones in that
14 Delta View -- I mean I'm sorry.

15 **DR. NETON:** That's fine.

16 **MR. GRIFFON:** The ones in the Delta View
17 database were cyclotron workers and they
18 wouldn't have been recorded that database that
19 we've seen? That's why that data wasn't
20 necessarily in there?

21 **DR. NETON:** Some of them were not in that.
22 Were some in there during the cyclotrons?

23 **MR. KERR:** No. If you -- if there's a --

24 **DR. NETON:** It -- It -- It's spotty though.

25 **MR. GRIFFON:** But they were all zeros. Okay.

1 **MR. KERR:** I would like to check. The amazing
2 thing is to me that there's a lot of things
3 with what we found out with -- we have just
4 recently been able to verify the cyclotron.
5 And before we had no handle on who was really
6 working at the cyclotron because we would
7 through departments but we didn't know names or
8 badge numbers. The reason we found enough
9 numbers there we can really tell who the
10 cyclotron crews were over really a fairly wide
11 period of time. Once you have that then you
12 can go back and easily check and see what their
13 dose is.

14 **MR. GRIFFON:** Right.

15 **DR. NETON:** Right.

16 **MR. KERR:** And we now find that there's a lot
17 of information on cyclotron workers. It's in
18 the X-10 database.

19 **DR. NETON:** Yeah, so this --

20 **MR. KERR:** And probably more information on
21 cyclotron workers in the X-10 database than
22 there is in the Y-12 because most of the
23 workers at the cyclotron were actually X-10
24 people.

25 **DR. NETON:** Right. I don't want to jump into

1 too much the cyclotron issue because that --
2 they're separate issues of cyclotrons but --
3 but the bottom line I think -- I'm sorry.
4 Wanda, you were going to say something?

5 **MS. MUNN:** I was just trying to say your soft
6 voice is -- is not getting --

7 **DR. NETON:** Oh.

8 **MS. MUNN:** -- to the recorder I don't think.
9 You're --

10 **DR. NETON:** We'll move the mike over.

11 **MR. GRIFFON:** You need to move the mike down to
12 the end of the table maybe or something.

13 **DR. NETON:** But -- So the -- the cyclotron is
14 a separate issue. I'd like to sort of tease
15 that out for the moment if we could --

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

17 **DR. NETON:** -- and say that, okay, the uranium
18 -- essentially the people who were mostly
19 working with uranium at this point in the CER -
20 - are captured in the CER database as -- as
21 zero values because when they measured them
22 they just made them zero when they read them if
23 they were less than the detection limit. You
24 know, it's pretty hard I think, unlikely to get
25 more than 40 -- 30 millirem in a week working

1 in a uranium foundry. That's at least my
2 opinion at this point. In '51 and '52 though -
3 - '50/'51, that's what they did. In '52 and
4 '53 then it became management policy to record
5 the detection limit if it were zero, if it were
6 not measurable. So then you see --

7 **DR. MAKHIJANI:** '53 or '52?

8 **DR. NETON:** '52 and '53. In '52 and '50-- this
9 is documented in one of the attachments that I
10 -- it's a Hap West interview that was conducted
11 with Donna Cragle I think in the '80s.

12 **MR. GRIFFON:** So then they recorded the LOD --

13 **DR. NETON:** So then they started recording the
14 LOD -- LOD at times --

15 **MR. GRIFFON:** -- if it was less than
16 measurable?

17 **DR. NETON:** -- if it was less than measurable.
18 So what you see is -- is a lot of doses
19 centered around 400 millirem all of a sudden.
20 Well, 30 times 13 is 390 so you're -- you're
21 starting to see a jump, a quantum jump in the
22 exposures and it looks like there's a lot of
23 dose there. So these are essentially, in '52
24 and '53, missed dose. To a large extent the
25 values that we see are influenced by missed

1 doses and so -- and onward from there actually.
2 It was the policy after '53 to keep doing that.
3 So you got the data in the CER database are
4 influenced tremendously after '51 by missed
5 dose values. Keep that -- Keep that in mind.
6 In fact it -- it's amazing how high some of
7 those could be. Now, there were high exposures
8 to extremities and external from -- from
9 working in foundries. I'll grant you that.
10 But some of the extra -- specific-- especially
11 since cyclotron workers were not in there, you
12 know, some of the high doses you see recorded
13 for internal, deep penetrating seem -- seem
14 somewhat high to us but again they're assigning
15 potentially 390 millirem a quarter based on
16 just missed dose. And in fact if you read the
17 report 32 that was put out by ORAU that sort of
18 developed this co-worker or the back
19 extrapolation model you'll see they have
20 detailed tables of distributions by year from
21 '52 through whenever and the distributions in
22 the '53/'54/'55 time frame when they were
23 monitoring selected workers who were we believe
24 would be the highest exposed workers, don't fit
25 any real distribution. That's why -- in fact

1 that's what -- that's what was the genesis of
2 this back extrapolation model because you'll
3 see if you look at those little histograms
4 there you'll see nothing and then all of a
5 sudden, bloop, a large block of workers at
6 almost 400 millirem per quarter and then
7 nothing and then a few more out here that
8 people may have had real high -- you know, real
9 exposures. So there are -- the data are not
10 amenable to developing distributions prior to
11 1956 and that -- that's well stated in the
12 report 32. So I'm like a yarn -- yarn teller
13 here but if you look on the next page, this is
14 a -- page 26 out of report 32. And what I'd
15 like to just focus on here is -- is the back
16 extrapolation graph. So how -- how is NIOSH
17 really treating workers who have no monitoring
18 data prior to 1956? Everybody have that page?
19 Hans, you don't have it?

20 **DR. BEHLING:** Yeah, I do.

21 **DR. NETON:** Is this -- This is it right here.

22 **DR. MAKHIJANI:** I have a question before you go
23 on.

24 **DR. NETON:** Yeah, sure.

25 **DR. MAKHIJANI:** On the first page of that, the

1 only real discrepancy in that first table there
2 in the -- before the 556 and the 703 --

3 **DR. NETON:** Uh-huh.

4 **DR. MAKHIJANI:** And given the numbers of
5 workers involved it seems like a -- if it were
6 a dose discrepancies were not that large. It
7 would seem that 150 worker discrepancies -- and
8 they don't appear anywhere else in the table so
9 where did the 150 workers appear from in the
10 CER database?

11 **DR. NETON:** What's their -- What's their job
12 categories? I mean we didn't analyze --

13 **MR. GRIFFON:** No, Arjun. For the number of
14 people.

15 **DR. MAKHIJANI:** Right. They're not --

16 **MR. GRIFFON:** There was 150 workers in the --

17 **DR. MAKHIJANI:** -- in the old -- did the old
18 memo miss workers that were later caught or --
19 that just --

20 **DR. NETON:** It -- It may be -- well, this is
21 1956 so this is after the skin and shallow.

22 **DR. MAKHIJANI:** Uh-huh.

23 **DR. NETON:** I really don't have an answer for
24 that at this point, Arjun, you know.

25 **DR. MAKHIJANI:** All right. I have another

1 question, just a quick one here. On this chart
2 here, the -- the one that you showed to us,
3 it's not -- it doesn't look like a slope of one
4 but that should be a slope of one. I think the
5 slope was a little less than one.

6 **DR. NETON:** That's an interesting observation.

7 **DR. MAKHIJANI:** As I'm reading it because it's
8 --

9 **DR. NETON:** Well, and I think that -- that --
10 that does go along with the fact that most of
11 the biases are in the negative in the --

12 **DR. MAKHIJANI:** Yeah.

13 **DR. NETON:** -- in that direction. Yeah, I
14 agree with that.

15 **DR. MAKHIJANI:** So the best fit would actually
16 --

17 **DR. NETON:** Right.

18 **DR. MAKHIJANI:** So while the points look like
19 they fall along the line pretty well it looks
20 like there's a systematic bias --

21 **DR. NETON:** Yeah.

22 **DR. MAKHIJANI:** -- because their slope is less
23 than one. So it would be useful to see the
24 regression.

25 **DR. NETON:** Good point. Very good point.

1 **MR. GRIFFON:** You raised a good point which
2 might be useful in adjusting.

3 **DR. MAKHIJANI:** Yeah, it might be because there
4 is a systematic error you might be able to make
5 some corrections.

6 **DR. NETON:** That's a very good point. I
7 appreciate that. Okay. I'll just make a note
8 of that before I forget.

9 **MR. GRIFFON:** That's sort of what I was
10 exerting with the differences being all on one
11 side.

12 **DR. NETON:** I agree with that.

13 **MR. GRIFFON:** Right.

14 **DR. NETON:** And again, some of those
15 differences may be because of the shifting of
16 the skin dose into the --

17 **MR. GRIFFON:** Right.

18 **DR. NETON:** -- deep dose category as I
19 indicated, you know.

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

21 **DR. NETON:** There certainly are some -- some
22 issues with the data. I mean you certainly
23 agree with that. To the extent that they
24 prevent us from doing dose reconstructions I
25 think is the subject of -- of where we're

1 heading here. Now, on this graph on page 26
2 you -- you'll see a scatter plot here and it's
3 somewhat deceptive because it's a log -- I
4 think it's a log scale. Yeah, it's a log
5 scale. And -- But -- But this is right out
6 of this report 32 and what ORAU has done is fit
7 a function for the data from starting in '57,
8 last -- last quarter of '56 through '60--
9 whatever time frame that is, '66, and picked,
10 you know, this is the famous 147 workers that
11 were selected who had -- were fully monitored
12 from '57 through '60-something and in fact had
13 -- had monitoring data in each of the quarters.
14 And in fact, in our opinion probably
15 represented the higher end of the work force
16 because of they were fully monitored and had
17 positive results and -- and such. Now, the
18 data -- the regression line fit through there
19 included missed dose for all those workers so -
20 - so when they had a quarter with a positive
21 value ORAU went back and added in the -- I
22 don't think it was a full 30 millirem. It was
23 probably the LOD over two which is what we
24 would normally do. Add those into their doses
25 to account for any missed dose because we only

1 had quarterly data so -- so that line that you
2 see through the black dots from '50-- into '56
3 through '65 time frame is -- is a regression
4 line through their doses including missed dose
5 because we only had quarterly data.

6 **DR. BEHLING:** Let me ask you a question on
7 that, your -- your assignment of missed doses
8 based on LOD value as opposed to using the
9 measured doses for those periods when they were
10 in fact monitored. And think we had that
11 discussion before when you said for instance,
12 let's assume that if the -- a person was
13 monitored on a weekly basis and you realize
14 that in a counted quarter there should be
15 thirteen entries but instead you only find six
16 and you said you would probably take thirteen
17 over six and multiply it times the --

18 **DR. NETON:** Correct.

19 **DR. BEHLING:** -- doses received during that
20 six-week period as an adjustment factor.

21 **DR. NETON:** Correct.

22 **DR. BEHLING:** And this was not being LOD
23 adjustment. This was being basically assuming
24 that if the doses received during the times
25 when the individual was monitored would in

1 essence be identical to the balance of the time
2 when he was not monitored.

3 **DR. NETON:** Well, we're saying the same thing.
4 I mean if I have one -- one result in the
5 quarter --

6 **DR. BEHLING:** Yes.

7 **DR. NETON:** -- and it's 100 millirem --

8 **DR. BEHLING:** Yes.

9 **DR. NETON:** -- then I'm going to assume that
10 the other 12 weeks --

11 **DR. BEHLING:** Also would have 100?

12 **DR. NETON:** No.

13 **DR. BEHLING:** No?

14 **DR. NETON:** Were LOD.

15 **DR. BEHLING:** LOD?

16 **DR. NETON:** Because you couldn't be higher than
17 that.

18 **DR. BEHLING:** Well, that's assuming that the
19 person was monitored and the monitoring --

20 **DR. NETON:** Okay. Well --

21 **DR. BEHLING:** -- resulted in the zero dose.
22 But suppose he was not monitored? That's the
23 question.

24 **DR. NETON:** Okay. If he wasn't monitored we're
25 -- we're still going with our opinion that they

1 were -- the people who were the highest
2 monitored -- were highest exposed were
3 monitored and so if he wasn't monitored then he
4 was not in that category.

5 **DR. MAURO:** This is a -- a change though from
6 what we discussed last time.

7 **MR. KERR:** He could have been sick. He could
8 have been on vacation, you know.
9 You don't know why it's not showing up. He was
10 assigned some regardless. If there was a zero
11 there for that time --

12 **DR. BEHLING:** Yeah.

13 **MR. KERR:** -- he was assigned an LOD because we
14 don't know what the situation was. But there's
15 -- I mean these people had vacation, they were
16 sick.

17 **DR. NETON:** Yeah. I think, you know --

18 **DR. BEHLING:** No, I think this is where we --
19 the difference is is as a conservative measure
20 I would have potentially said well, maybe not
21 every person was monitored for each of the
22 cycles in the calendar quarter and there is
23 some point, and I think you -- you may have had
24 that discussion on the conference call -- when
25 I look for instance during the second quarter

1 of 1958 when I think one of your tables, table
2 8-3 or something had identified somewhere
3 around 690-some odd people who were monitored
4 but for that one week, the 25th week of 1958,
5 the health physics record showed that there
6 were only something like 378 or something like
7 that monitored. And it gave me the feeling
8 that perhaps the people who were monitored
9 during that week weren't always monitored
10 throughout the quarter even though their job
11 may have been the same.

12 **MR. KERR:** From 147 people selected for the
13 fact that they were continuously monitored over
14 the period.

15 **DR. NETON:** Right.

16 **MR. KERR:** There were just some zeros in the
17 record here, there and yonder. We filled in
18 and didn't --

19 **DR. NETON:** Right.

20 **MR. KERR:** -- and tried to measure as
21 conservatively as possible.

22 **DR. NETON:** This -- These people were -- were
23 hand-picked for a reason that they had
24 exposures that were well monitored over an
25 entire period. It is not like we went and just

1 ran and we selected workers for 40-- from '57
2 through -- and I think we -- we ought to focus
3 on those people's records because that's the --
4 I think and ORAU -- SC&A has actually done a
5 review of those and I thought that they -- they
6 did agree that those workers appeared to be
7 more highly exposed workers.

8 **DR. MAURO:** I think the confusion may have been
9 that it was our understanding that some of
10 those 147 did not have -- were not monitored
11 every week in every quarter.

12 **DR. NETON:** Well, we have no way of knowing
13 that really. And in fact after '60 it wasn't
14 weekly any more. It went to --

15 **DR. MAURO:** Right.

16 **DR. NETON:** Quarter.

17 **DR. MAURO:** -- quarter.

18 **DR. BEHLING:** In which case it makes no
19 difference.

20 **DR. NETON:** After '60 it's -- it's a moot --
21 it's not -- it's not an issue so you're talking
22 between '57 and '60.

23 **DR. MAURO:** Right. And, you know, the -- the
24 only thing is there are two different things in
25 here. And one is that, okay, if we have a

1 worker in 1957 who's part of the 147 and you've
2 got six weeks worth of actual measured
3 monitored data, then the rest of it --

4 **DR. NETON:** We wouldn't have weekly data
5 though. We only have quarterly data.

6 **DR. MAURO:** And all -- all of those are
7 quarterly?

8 **DR. NETON:** Every -- Every dose as a result we
9 have is quarterly.

10 **DR. MAURO:** For the 147?

11 **DR. NETON:** For anyone.

12 **DR. BEHLING:** So you're blindly assuming that -
13 - that the -- if there were missed doses it's
14 due to the fact that they were -- the recorded
15 dose that came out as zeros as opposed to --

16 **DR. NETON:** Correct.

17 **DR. BEHLING:** -- I think it was not monitored?

18 **DR. NETON:** Correct. Now, you know, one would
19 argue why would they -- if the person is
20 showing positive results, you know, why would
21 they -- we have no indication to believe that
22 they were rotating people through as I know
23 Hans, has been one of your thoughts all along.
24 That they would rotate people through and Mr.
25 Worker X would get his 100 millirem badge this

1 week and we take it away and give it to the
2 next guy because he might be -- That's not the
3 way at least the memo trails that I have read -
4 - they look to us like they were purposely
5 picking people that were working in the
6 trenches doing the work and -- and monitoring
7 the -- the high end of the -- of the --

8 **MR. RUTHERFORD:** And wouldn't that -- I mean if
9 they did that in those early years, '57 to '60,
10 artificially drive the maximum doses down?
11 Because if you're spreading the TLD around the
12 -- the total cumulative dose for that
13 individual is going to be driven down which we
14 clearly didn't see that when you looked at the
15 later data for the same operations to the
16 earlier data. So I -- I -- I'm -- I don't see
17 that effect.

18 **DR. NETON:** Well, in fact you could see on this
19 graph the spread of the data for the 147
20 doesn't look tremendously different to me prior
21 to 1960 and these are the same monitored
22 workforce --

23 **MR. GRIFFON:** Right.

24 **DR. NETON:** -- who were monitored quarterly
25 versus weekly. It's the same people. I -- I

1 don't see that there's a -- a drop in that at
2 all. In fact it looks very similar. It does
3 go up per the -- the regression line. But I
4 think this is a point where we're just going to
5 have to say we may disagree on whether missed
6 doses are appropriate to add to those workers
7 or not. And the bottom line is what effect it
8 might have on the overall back extrapolation
9 because I think -- I think the line that's fit
10 from '60 onward is pretty much consistent with
11 the line before 1960.

12 **DR. BEHLING:** That's it. I only base it on
13 circumstantial evidences. I have no real data.

14 **DR. NETON:** Yeah.

15 **DR. BEHLING:** But as I said one data point that
16 came up was the 1958 25th week where for that
17 second counted quarter I think one of George's
18 tables identifies somewhere around 700 people
19 were monitored in that quarter but yet for the
20 25th week there was some accounting that was
21 done at the request of health physicists to --
22 to say how many people were -- were there
23 exposures to in that group. And I only counted
24 370 which is about 50 percent of the people
25 monitored in that counted quarter.

1 **DR. NETON:** '58 sounds suspiciously in the --

2 **DR. BEHLING:** Well --

3 **DR. NETON:** -- criticality time frame.

4 **DR. BEHLING:** Yes. It was within that time
5 frame.

6 **MR. RUTHERFORD:** The 25th week is that week,
7 yeah.

8 **DR. BEHLING:** Yes, it was --

9 **DR. NETON:** Yeah, well, this may be somewhat of
10 an anomaly then. I don't know whether --
11 whether --

12 **DR. BEHLING:** The only thing I can say, it's
13 true. You don't want to match one by one. As
14 you mentioned there are people coming in and
15 out of the system. They may retire. They may
16 come into the workforce in any counted quarter
17 and so the numbers should never match one to
18 one. But a factor of two seemed a bit too much
19 to -- as a discrepancy for me to assume. But
20 to the way a person is monitored, he's
21 monitored always and -- and that's the only
22 reason I bring it up.

23 **DR. NETON:** Okay.

24 **MR. KERR:** I -- I -- I've got to submit that
25 the way we have -- we have amendments here that

1 I'd like to let you look at.

2 **THE COURT REPORTER:** Dr. Kerr, could you come
3 close to the table, please?

4 **MR. KERR:** Sorry. Hans, when we have a time
5 away from the table today I have some memos
6 with me that I'd like to show you and let you
7 look at. And I think we can really clear up
8 this -- some of these questions you have about
9 who's ro-- the rotational monitoring --

10 **DR. BEHLING:** Uh-huh.

11 **MR. KERR:** -- and so forth so let's don't take
12 up time here.

13 **DR. BEHLING:** Yeah.

14 **MR. KERR:** But let's look at those aside and
15 see if we can resolve some of these questions
16 you have.

17 **DR. BEHLING:** Okay.

18 **MR. GRIFFON:** Also, if you have the references
19 on those memos or if they're on the O-drive
20 somewhere that would be --

21 **DR. NETON:** Yeah.

22 **MR. GRIFFON:** -- I think we'd all be interested
23 in that.

24 **DR. NETON:** And I think some of them are maybe
25 attached --

1 **MR. GRIFFON:** Some of them might be in your
2 package? Yeah.

3 **DR. NETON:** George -- George might not realize
4 it but I've attached a number of these memos to
5 your handout.

6 **DR. MAURO:** Could I just step back a little
7 bit? When we had our conference call it was my
8 sense that in regard to this -- the issues
9 we're talking about here, the concern was some
10 discrepancies in the early extent of dosimetry
11 data that we sort of identified in the minutes.
12 And the problem was those discrepancies created
13 the situation which might have made it
14 difficult for you to validate your
15 extrapolation model. And that one -- that was
16 the only real issue. The -- Once -- Once
17 there was a confidence on your part that you
18 understood what the discrepancies were then as
19 I understood, then you were back to the place
20 where we are in a position where we can
21 validate our model using your earlier data.
22 And then we leave the SEC realm and we move
23 into the site profile realm. Is -- Is that
24 where we are right now?

25 **DR. NETON:** That's where I'm trying to head but

1 I -- I can't get past Hans's issue here with
2 this whether we put 100 millirem or -- and I
3 think that's a tractable problem. I think to
4 answer Hans's issue I mean you -- you could go
5 and go back and redo this entire analysis and
6 give them that dose for every week and -- and
7 see how it changes this back extrapolation
8 model.

9 **MR. GRIFFON:** That would still make the site
10 profile.

11 **DR. NETON:** Yeah, that -- that -- that's just a
12 difference in opinion as to how one interprets
13 the '57 through '64 data so --

14 **DR. MAURO:** No, the reas-- no, that's what I --

15 **DR. NETON:** Bear with me here.

16 **DR. MAURO:** So I want to -- I guess I'd like to
17 get a little more crisp in terms of I guess in
18 light of the analyses that I --

19 **DR. NETON:** Right.

20 **DR. MAURO:** -- that -- and the tables you've
21 shown us --

22 **DR. NETON:** Right.

23 **DR. MAURO:** -- and the description you've
24 explained regarding these columns --

25 **DR. NETON:** Right.

1 **DR. MAURO:** -- am I hearing that you're getting
2 a little bit more comfortable with
3 understanding what transpired in those early
4 years and the discrepancies that apparently
5 y'all saw?

6 **DR. NETON:** I think yes.

7 **DR. MAURO:** Is that what I'm hearing?

8 **DR. NETON:** I'm trying to -- I'm trying to get
9 there but unfortunately I have to go through
10 and explain what we're doing on individual dose
11 reconstructions to give you a sense of how the
12 data do or do not support that conclusion. I'm
13 going to have to -- you have to bear with me.
14 I don't think it's well understood how we're
15 doing these.

16 **MR. GRIFFON:** Let me ask about data, too, on
17 the -- it seems like you've -- and we did ask
18 for this, this question of pre-'56.

19 **DR. NETON:** Right.

20 **MR. GRIFFON:** But also the -- the overall
21 external data reliability question. You know,
22 obviously the model is relying on '56 through
23 '65, right?

24 **DR. NETON:** Uh-huh.

25 **MR. GRIFFON:** Heavily on -- on that data.

1 **DR. NETON:** Right.

2 **MR. GRIFFON:** Have -- Have you found any
3 supporting documents in that area? I know we
4 focused on probably '48 to '57 because it's the
5 SEC period.

6 **DR. NETON:** Sure.

7 **MR. GRIFFON:** But, you know, really --

8 **DR. NETON:** Yeah.

9 **MR. GRIFFON:** -- the dose reconstruction would
10 rely on the later data. I just, you know, in --
11 -- in glancing at some of these memos and --

12 **DR. NETON:** Yeah.

13 **MR. GRIFFON:** -- it was 11:00 o'clock last
14 night. I mean there -- there are some
15 interesting twists and turns on how they got
16 from here to there -- for these database data.
17 I mean the -- the West memo --

18 **DR. NETON:** Yeah, sure.

19 **MR. GRIFFON:** -- where he discussed -- I mean
20 he -- he clearly says that there was no raw
21 data even then when he was trying to --

22 **DR. NETON:** Right. But --

23 **MR. GRIFFON:** -- understand this stuff so --

24 **DR. NETON:** -- if I can explain the comparison
25 I'm getting to an invalidation it might -- it

1 might at least make my point.

2 **MR. GRIFFON:** All right. I'll wait for you to
3 -- to finish.

4 **DR. NETON:** Now, whether you guys agree or
5 disagree with that interpretation, but bear
6 with me. Remember, we got a missed dose -- we
7 got the monitored workforce with, you know,
8 thousands of quarters per year and -- and so
9 they were monitored. And it is our contention
10 that they were more highly monitored workers
11 and so in worst case you've got a missed dose
12 issue. I mean they didn't record anything for
13 less than zero so you've got 52 weeks times 30.
14 You've got a 15 -- 1.5 rem missed dose issue to
15 deal with. But I want to point out where we --
16 what this back extrapolation model shows. We
17 did get -- well, there's one additional data
18 point we got in 1955 that I'll talk about later
19 with an HP report where they -- the average
20 millirem per quarter in 1955 came out 1554 and
21 the CER database came out 1531 so we do have
22 one additional piece of information I just
23 received this morning.

24 **MR. GRIFFON:** Okay.

25 **DR. NETON:** It's not in here but -- so we do

1 have some validation there. And again after
2 '55 we're much more confident because remember,
3 February 28, '55 is when they upped the skin
4 dose limit so they had to intentionally track
5 separately deep and shallow. And so they were
6 monitored separately. And the comparison that
7 we did later on with the -- with the Delta View
8 showed that the data matched fairly well. I
9 think it was a later time frame but --

10 **MR. GRIFFON:** I think it was '53.

11 **DR. NETON:** Was that '53?

12 **MR. GRIFFON:** Wasn't that '53?

13 So anyway we still -- the '56 -- I mean I -- I
14 agree on the '56 through '65 therefore should
15 be more one to one correlation --

16 **DR. NETON:** Right.

17 **MR. GRIFFON:** -- is what you're saying.

18 **DR. NETON:** Right. Yeah.

19 **MR. GRIFFON:** So if you were --

20 **DR. NETON:** It's very difficult to find those -
21 - those pieces of data unfortunately. But if
22 we can get past the red line through the solid
23 black dots here and whether we use Hans's
24 approach or our approach, let's assume that
25 that line can be constructed somehow. Now

1 we've got the extrapolated line back into the
2 1950 era where -- where -- we -- we know we
3 have a lot of workers who -- who were not
4 monitored. So let me just brief-- briefly
5 explain what we would assign. This is -- This
6 is -- it's a little misleading because it says
7 year on the bottom but this would be the dose
8 assigned per quarter to each individual so in
9 other words, if you go back to 1950, you know,
10 you'll see it will be somewhere around 300
11 millirem per quarter assigned to a worker based
12 on the back extrapolation so you're talking
13 about 1.2 rem or exposure at a uranium facility
14 not counting cyclotron workers. Pretty --
15 Pretty generous dose assignment I think.

16 **MS. MUNN:** Very generous. Very generous.

17 **DR. NETON:** Now, one thing I want to point out
18 though is this curve is based on assigning
19 missed -- two things: missed dose is included
20 to generate that curve so it -- we're -- we're
21 already in my opinion accounting and somewhat
22 biasing it high because it's our -- it's been
23 our experience that missed dose -- if you add
24 missed dose in at face value it biases a
25 worker's exposures high. It's almost

1 impossible to have 13 -- 12 badge reads at the
2 detection limit in a row all read less than
3 detectible and add that dose. So that's point
4 number one. The second point is that this
5 curve in itself was -- it's a little difficult
6 to explain because of the -- the maximum
7 likelihood process that was used here but in
8 the regression analysis for this curve they
9 assumed a geometric standard deviation of the
10 data points here. Instead of using sigma in
11 the regression analysis they used the 95th
12 percentile of sigma to fit the curve. Now, how
13 that corresponds one to one with what came out
14 here is difficult to explain other than if you
15 look at the table on the next page. You'll see
16 the geometric mean of the regression line, say
17 in '47, was 194 E-dose which is what NIOSH
18 would use in the quarterly dose assignment,
19 came out 385. That is a direct result of using
20 the 95th percentile of the geometric standard
21 deviation in fitting the regression model. It
22 -- It's -- It's very complicated to describe
23 what the effects -- I can just show you
24 empirically what the net effect was. But my
25 point is that you have -- you have already used

1 missed dose to generate the regression line and
2 on top of that you've used the 95th percentile
3 of the sigma value to generate the regression
4 line so you're -- you're already way up there
5 is what I'm trying to point out.

6 **MR. GRIFFON:** That -- That's pretty -- you --
7 you can easily track that through on these
8 spreadsheets that support. I haven't looked at
9 the -- I mean I've looked at those --

10 **DR. NETON:** Yeah.

11 **MR. GRIFFON:** -- that's laid out there. The
12 calculations are --

13 **DR. NETON:** Yeah, the calculations are laid out
14 there. And it -- it's pretty arcane subject
15 matter but yeah, it's there. Okay. So now I
16 can get into this -- this next --

17 **DR. BEHLING:** Okay. Can -- Can you just --

18 **DR. NETON:** Yeah.

19 **DR. BEHLING:** The E-dose is basically the
20 assigned dose without a sigma value?

21 **DR. NETON:** No, it has a sigma value as well.

22 **DR. BEHLING:** You're saying it's built in.

23 **DR. NETON:** Right. Yeah.

24 **DR. BEHLING:** But this would be entered in as a
25 deterministic value?

1 **DR. NETON:** No, it would have a sigma value
2 associated with it as well which would be the
3 propagated sigma of the geometric standard
4 deviation and the organ dose conversion factor.
5 I went through the -- the tools yesterday to
6 verify this. So what you have is, you know,
7 the do-- the organ dose conversion factor or
8 the triangular distribution. And you -- you
9 couple that with the geometric standard
10 deviation on this E-value and you end up with a
11 propagated log -- it ends up being lognormal
12 because a lognormal drives the distribution.
13 And so you'll end up assigning an E-dose with
14 its associated geometric standard deviation
15 that's propagated through the process. So
16 again it's not just that although, you know,
17 it's a sampling process and as we've been down
18 the line you effectively end up sampling higher
19 than that because if this uncertainty is small
20 compared to the overall uncertainty you'll
21 effectively sample the mean of the
22 distribution. It's getting pretty technical
23 here but --

24 **DR. MAURO:** Again, it's -- I'll ask you a
25 simple question and just make sure I understand

1 what I'm looking at. On the table 5 that we're
2 looking at now -- not -- we're looking at 1947
3 -- you have this 194 millirem in that quarter.
4 That -- That's a geometric mean obtained from
5 real data?

6 **DR. NETON:** Yeah, that's the black dot. That's
7 the geometric mean of the regression line --

8 **DR. MAURO:** So there was a certain number of
9 workers that actually were measured in that
10 quarter?

11 **DR. NETON:** That is the best estimate of the
12 workers' exposures --

13 **DR. MAURO:** Right.

14 **DR. NETON:** -- in that quarter.

15 **DR. MAURO:** And that was from the data -- but
16 this was from -- measured from badge film?

17 **DR. NETON:** Oh, no, no, no, not '47. This is
18 the projected --

19 **DR. MAURO:** Okay.

20 **DR. NETON:** -- regression line from the --

21 **DR. MAURO:** Okay. Then -- and then the -- the
22 past the progre-- from the regression line then
23 what's -- then what's the I guess the E-dose?
24 I'm having trouble understanding what this
25 number is?

1 **DR. NETON:** Okay. That would be the regression
2 line if one used the data as it was. Used it,
3 the geometric mean of standard deviation for
4 all the data after '55.

5 **DR. MAURO:** Okay. That would be the 194?

6 **DR. NETON:** Right.

7 **DR. MAURO:** Okay. Then --

8 **DR. NETON:** Now, I don't -- I didn't reproduce
9 it here but there's a -- there's a -- in table
10 -- in report 32 there's especially one
11 sentence. It said to be more claimant
12 favorable instead of using the sigma value for
13 either of those years after '56 in the
14 regression calculation they used the 95th
15 percentile as if it were sigma.

16 **DR. MAURO:** Okay.

17 **DR. NETON:** And then they -- they fit the line
18 using that. And this is what you end up with
19 doing that. And in fact if you look at the
20 equation underneath the -- underneath figure 2
21 here that -- that -- that equation, $E\text{-dose} =$
22 $EXP3.6 - .122 \text{ year} - 61$, that little appendage
23 there plus $.5 \times 1.147$ squared is the correction
24 that they added to increase the E-dose. In
25 other words, if you would get the -- what you

1 would get -- 140-- 194 without that $.51 \times 1.47$
2 squared. And that's the additional increase
3 due to account for the -- allowing for the
4 sigma to be equal to the 95th percentile.

5 **DR. MAURO:** Now I understand. Now, a follow-up
6 question.

7 **DR. NETON:** Sure.

8 **DR. MAURO:** Now, in one of the tables that you
9 are providing you actually do have some records
10 of external measurements. For example in 1948
11 it looks like there were 162 personnel. I have
12 it -- I'm looking at one if the tables you've
13 provided. I'll just tell you what the numbers
14 are. The -- There actually were measurements.

15 **MR. GRIFFON:** Yeah, yeah, yeah, yeah.

16 **DR. MAURO:** And there were 162 workers
17 monitored in 1948. And the total number of
18 records in 1948 for those workers were 3,599
19 which is a lot of records. So there were a lot
20 of records. Now, what I'd be interested in
21 knowing, so okay, there's your real records.
22 Now if I took the doses for those all 166
23 workers and I just said, you know, here's --
24 here's the dose in that year, 1948, here's the
25 -- the highest dose for the highest person.

1 Second highest, third highest, you know, just -
2 - just made a long list So here's -- here's -
3 - if I just use the data for those -- and there
4 -- by the way there were over 2,000 workers so
5 what we're really saying is in 1948 there were
6 2,511 workers. You had data in 1948 for 162 of
7 them. And look, I'll show you --

8 **DR. NETON:** John, we're getting there. I --
9 I've got that comparison.

10 **DR. MAURO:** Oh, is that where you're heading?

11 **DR. NETON:** I'm heading there.

12 **DR. MAURO:** I'm sorry.

13 **DR. NETON:** I'm heading there. I'm sorry. I'm
14 sorry to have to be so -- but I think it's
15 important to understand what we've done.

16 **DR. MAURO:** Okay.

17 **DR. NETON:** I hope you agree I mean because
18 otherwise I mean we -- we -- we have no basis
19 of comparison.

20 **DR. MAURO:** Okay.

21 **DR. NETON:** So we're going to -- we're going to
22 assign this lot, okay, so you can read it.
23 We're going to give them about 1,200 millirem
24 with the distribution say for 1948. I think we
25 all agree that seems to be a fairly generous

1 assignment of dose. The one other thing I just
2 want to bring out because I don't want to get
3 confused about these scaling factors. If a
4 worker was monitored after '56 we have some
5 additional knowledge that we don't have for
6 people who were never monitored, right? I mean
7 and so the scaling factor was built into the
8 calculation to account for the fact that maybe
9 a worker was at the high end of the exposure
10 after '56. You can see there's a big spread of
11 these black dots. What if he was the worker
12 way to heck up here? So to account for that
13 we'll say, well, if he's got five quarters of
14 data here to show us that he's really at the
15 higher end up in here we're going to scale his
16 doses parallel to that red line and say it
17 certainly goes up and it goes up proportionally
18 and we're not going to under-assign him a dose
19 prior to 1957. That -- That was the whole
20 point of the scaling factors. If by definition
21 though if you have no monitoring data at all
22 before '57 your scaling factor is one because
23 we've already decided that the highest exposed
24 workers were monitored. He is not by
25 definition one of these workers with the high -

1 - at the high end of the distribution. So that
2 -- that's where we're at. Okay. Now, if you'd
3 just -- there's a report here that George Kerr
4 put together for us. It's called validation of
5 backward extrapolation model. I'm sorry?

6 **DR. MAKHIJANI:** Can I ask you a question about
7 that? In the '56 to '60 period some workers
8 were monitored part of the time because some of
9 the record in the evaluation report you
10 indicate that people were taken off monitoring
11 because they didn't have high doses or they
12 were on monitoring -- they were put on
13 monitoring so obviously it's varying so how --
14 how do you deal in the scaling factor with the
15 partially monitored?

16 **DR. NETON:** Right now my understanding -- my
17 understanding of the procedure is that it's
18 five quarters -- I think it's five quarters of
19 monitoring data that you could use. But --
20 But if it's not there then it would have to be
21 -- there would have to be some judgment made.
22 I mean, you know, we -- we --

23 **DR. MAKHIJANI:** Yes. You said that.

24 **DR. NETON:** We have clear-cut procedures but
25 clearly the guy has a huge dose in 1958 and his

1 job title is the same and it goes back. We're
2 going to -- We're going to make some -- some
3 adjustment for that. But proceduralized right
4 now it's five quarters. Okay. Let's move on
5 to the next document that's entitled validation
6 of back extrapolation model. And I'm not crazy
7 about the term validation but maybe evaluation
8 would be a better term. But given the data we
9 have, if you'll look at the figure 1, after
10 1957 we will assign, you know, we -- we have
11 it. We have the data for the workers so we'll
12 assign it. Prior to 1956 though what you see
13 is a line that is equivalent to that red line
14 on the other document. And the circles are the
15 projected annual doses that we would assign to
16 the workers for those years with unmonitored
17 data. So you can see back around in 1958
18 you're upwards around 1300 millirem per year.
19 In 1951 you'd be right around a rem. So these
20 are the -- these are the assigned deep doses
21 for these workers who were unmonitored who in
22 our opinion had lower exposures than the
23 monitored workers. And remember this is based
24 on an extrapolation of 147 workers including
25 missed dose assigned to them. So that's --

1 that's what we assigned and -- and on top of
2 this it's not shown but you would have a geo--
3 it's not shown but you would have some kind of
4 a geometric standard deviation about each of
5 those points to account for the uncertainty of
6 the backward extrapolation model. So you end
7 up with some pretty high -- high -- you end up
8 with a very high estimate and a geometric
9 standard deviation about those values.

10 Has everybody got -- it's -- it's this page
11 with the figure 1 and figure 2 on it.

12 **MS. MUNN:** Page 3?

13 **DR. NETON:** Right.

14 **MS. MUNN:** Right.

15 **DR. NETON:** The first one is deep dose. The
16 second figure two is beta particles. So in an
17 attempt to go back and look at the data that we
18 have -- remember we have data prior to '57.
19 We've looked at it. We -- We've acknowledged
20 just earlier that there are issues with this
21 data because of recording practices and
22 whatnot. Notwithstanding those issues though,
23 and remembering that after '51 all of the doses
24 include missed dose by definition. Every time
25 a person was monitored with zero they added 30

1 millirem so we've got -- what we have here is
2 the projected line includes missed dose and now
3 we're -- we're comparing it to values X factor
4 '51 of people's doses that includes missed
5 dose. And we just did a straight comparison of
6 what the back extrapolation model would assign
7 versus what we currently had in the database.
8 And this -- this is the average value that's in
9 the database.

10 **DR. MAURO:** So am I correct in interpreting
11 that your extra-- extrapolation model provides
12 a high level of assurance that you're going to
13 overestimate the mean dose in a given year for
14 a given unmonitored worker?

15 **DR. NETON:** It is -- It is our opinion --

16 **DR. MAURO:** And I think we've never doubted
17 that that -- that you overestimated -- I don't
18 know. This is -- This is my opinion. You
19 would always -- you would overestimate the mean
20 dose, but it's always been our concern that
21 there may be a population of workers -- sub-
22 population of workers in the earlier years that
23 that back extrapolation is going to be
24 potentially underestimated for those workers.
25 Now, granted, one of the discussions we had is

1 that that's going to be, you know, the vast
2 majority of these thousands of workers are
3 going to fall below the projected back
4 extrapolation. That's true. And I think that
5 that brings us -- you know, we're really in a
6 site profile issue right now. So that brings
7 us to the question is, are there substantial
8 numbers of workers who are unmonitored in the
9 early years that had a good likelihood of
10 experience and exposures well above the values
11 that were back extrapolated? No doubt that
12 you've overestimated the mean for the
13 population of workers. But the question is is
14 this, you know, is this where you want -- where
15 you want to be?

16 **MS. MUNN:** Is there any evidence --

17 **MR. KERR:** You can go to these means now and
18 (inaudible) the monitored workers.

19 **MR. RUTHERFORD:** But the means are for the
20 monitored workers?

21 **DR. NETON:** Yeah.

22 **MR. KERR:** The means that are shown down here
23 at the bottom --

24 **MS. MUNN:** Right.

25 **MR. KERR:** -- are from the monitored workers.

1 **DR. MAURO:** Yes.

2 **DR. NETON:** Including the missed dose for the
3 monitored workers.

4 **MR. KERR:** That's not unmonitored workers.
5 That is the monitored workers.

6 **MR. RUTHERFORD:** So the only way you could come
7 up with that is if you do not believe the
8 maximum exposed people were monitored. That's
9 the only way you can make that interpretation.

10 **MS. MUNN:** Has there ever been any evidence --

11 **DR. MAURO:** We have no evidence whatsoever of
12 that. When you compare -- when you look --
13 remember early on when we looked at the data
14 from '61 on when everyone was monitored and we
15 identified the maximum exposed people during
16 that period. When we -- we went back in the
17 earlier years those same people were the same
18 maximum exposed people with the same max doses.
19 So I think we've done that comparison already.

20 **DR. NETON:** Well, With some caveats.
21 Be careful but --

22 **DR. MAURO:** There's a sim-- We're really --
23 We're really right back I guess to where we
24 started with in the population of workers that
25 were all monitored. When those workers were

1 selected I am now convinced that two things
2 happened. There was an effort absolutely to
3 monitor the workers that had the high end
4 exposures. There was also an effort to capture
5 workers in a large number of different
6 departments so there was like a little bit of
7 both. A little bit of --

8 **DR. NETON:** Cohort worker.

9 **DR. MAURO:** But it wasn't all that. In other
10 words, because there's no doubt that -- that
11 the departments that have the higher exposures
12 had a greater number of workers in the pot. So
13 -- So it was a little bit of both. Now the
14 question becomes when you look at the mean of
15 all the numbers what we're really saying is you
16 get the mean of all the numbers which reflects
17 a chunk of people that were the departments
18 that got higher exposures, but some people, a
19 chunk of people that were in the departments
20 that got low exposures. So when you roll the
21 whole thing up what you get it an overall
22 picture that would be a somewhat dilution of
23 the exposures to the people that were in the
24 high end departments. And that's -- But I see
25 that as a site profile issue.

1 **DR. NETON:** I agree. I agree with you. But
2 remember that this E-dose is a factor of almost
3 two higher than the projected mean value of the
4 distribution to begin with. We've already
5 built into some conservatism on that level.

6 **DR. MAURO:** So that protects you from that.

7 **DR. NETON:** Well, we feel -- we feel strongly
8 that that's the case.

9 **DR. MAURO:** Protects your position by doing
10 that.

11 **DR. NETON:** Yeah.

12 **DR. MAURO:** Okay.

13 **DR. NETON:** And so --

14 **MR. RUTHERFORD:** I think your discussion on '48
15 and '49 dose will even add. We already built
16 in to some conservatism on that level.

17 **DR. MAURO:** Right. So that protects you.

18 **DR. NETON:** Well, we feel -- we feel strongly
19 that that's the case.

20 **DR. MAURO:** That's your position, I mean by
21 doing that. Yeah, okay.

22 **DR. NETON:** And so --

23 **MR. RUTHERFORD:** Well, back to your discussion
24 on '48 and '49 those would even add more value
25 to it.

1 **DR. NETON:** Well, '48 and '49 is way, way below
2 as well. And that was based on some of the PIC
3 data as well as the film badge data that George
4 wrote a report on that we had talked about in
5 the past. I just feel that, you know, you --
6 you have a curve that is based on -- I don't
7 know, on what -- our curve, our back
8 extrapolation curve is based on including
9 missed dose for the highest exposed worker --
10 for the what we believe to be the highest
11 exposed worker. We went back including that
12 missed dose. And we used the 95th percentile
13 of the -- of the same, jack it up by either a
14 factor of two. And now we're comparing this to
15 the monitored workers and they fall pretty well
16 below that. And those monitored workers
17 include, after '52, missed dose itself. So
18 we're comparing a -- a huge missed dose
19 overestimate to a missed dose overestimate of
20 the actual workers and we're above that. I --
21 I find that to be a pretty convincing scenario
22 in my mind that we're not under-assigning doses
23 to uranium workers in this facility. And in
24 particular in light of the fact if we're saying
25 that these cyclotron workers are not in here.

1 Now, if the cyclotron workers were in here I'd
2 feel a little less comfortable --

3 **DR. MAURO:** Right.

4 **DR. NETON:** -- because we know that those were
5 some very high exposures. I mean clearly very
6 high. So you're talking about a uranium
7 foundry, a facility. It's hard to imagine
8 getting doses much higher than this in the
9 workplace. Is there -- Is there a segment of
10 population that was unmonitored? I -- I have
11 trouble believing that that's true. Could it
12 have happened? I can't say with 100 percent
13 certainty that it didn't.

14 **DR. BEHLING:** To some extent I'm somewhat
15 biased because I reviewed the Paducah TBD.

16 **DR. NETON:** Right.

17 **DR. BEHLING:** And they run a parallel path.
18 Their conversion from partial monitoring to
19 full monitoring occurred in exactly the time --
20 time frame that occurred here. And -- And I
21 looked at that data and they, too, expressed
22 the opinion that the most or the highly exposed
23 population was monitored prior to the
24 conversion to whole monitoring. And then they
25 actually had a couple documents that showed the

1 distribution of doses among people prior to
2 that conversion and after and -- and they have
3 distribution that says zero to one rem a year -
4 -

5 **DR. NETON:** Yeah, I remember talking about
6 that.

7 **DR. BEHLING:** -- to one to two rem and I
8 believe the numbers go at a time when they
9 monitored only 500-and-some odd workers they
10 have 15 people in the one to two rem, the
11 highest distribution. And then they converted
12 to all monitoring workers that went from 500-
13 some odd people to over 1,600, more than
14 tripling the -- the original people monitored.
15 And of course, the assumption now would have
16 been that the people who weren't monitored, the
17 additional 1,100 people would have fallen all
18 into the low exposure category. And instead
19 when you look at the people that went -- that
20 were prior to that, 15 people who fell into the
21 one to two rem among the 500, and then they
22 went to 1,600 people monitored, they went from
23 15 to 75. And you sort of say well, they don't
24 -- it doesn't seem to -- to jive.

25 **DR. NETON:** I'd be careful, though,

1 interpreting that. I mean are we looking at
2 missed dose issues here again?

3 **DR. BEHLING:** Yeah, I don't --

4 **DR. NETON:** Missed dose plays a huge part in
5 these early dose reconstructions. You know,
6 you've got 52 badges with a 30 millirem
7 detection limit. Depends on whether you add
8 the 50 in like they did in '53 or they did not,
9 or was it, you know --

10 **DR. BEHLING:** I think there were quarterly
11 doses and I don't think the issue of missed
12 dose was part of that equation.

13 **DR. NETON:** Well, I don't know. I'd like to
14 see it.

15 **DR. BEHLING:** Yeah. And -- And -- And it
16 just struck me and so in that way I'm somewhat
17 biased --

18 **DR. NETON:** Sure.

19 **DR. BEHLING:** -- in saying, okay, here we have
20 Paducah and it's on a parallel path between
21 partial monitoring of a workforce to full, and
22 we have a distribution that in crude terms
23 defined worker exposure between zero and one
24 rem a year, one and two rem. And we went from
25 15 people in the one to two rem representing a

1 total worker population monitored of 560. And
2 then you add 1,100 new workers and -- and they
3 should have all been in -- in the lower
4 portion.

5 **DR. NETON:** Right.

6 **DR. BEHLING:** And instead you went from 15 to
7 75, a five-fold increase. And that's what?

8 **DR. NETON:** Right. And that was at Paducah?

9 **DR. BEHLING:** That's correct.

10 **MS. MUNN:** But Hans, in the Paducah case you
11 have evidence --

12 **DR. BEHLING:** Right. We have --

13 **MS. MUNN:** -- that there was a problem.

14 **DR. BEHLING:** Right.

15 **MS. MUNN:** In this case there is no evidence.

16 **DR. BEHLING:** No, I -- I understand that.

17 **MS. MUNN:** It's just --

18 **DR. BEHLING:** What I'm saying is that you could
19 be -- I'm fully aware -- I think we're all
20 assuming that the average dose is an inflated
21 dose, that people are mostly going to get a
22 generous assignment of the dose they probably
23 didn't deserve. But as -- as John is saying,
24 we're looking at it and it's just like the
25 environmental protection. The reasonably

1 maximum exposed, he probably is a rare bird
2 there's no question. But John's concern is
3 that are there some potential people out there,
4 a very few and who's to say if any of them even
5 have a claim, that on a basis of your generous
6 assignment would still be underestimated.
7 That's the only issue.

8 **DR. NETON:** I -- I -- I understand.
9 I understand what you're saying.

10 **MR. KERR:** As we handed out something or Jim
11 did at an earlier meeting which re-looked into
12 1961 group of workers, and we looked at --
13 split that 1961 into two groups; ones who had
14 been monitored before 1961, ones who hadn't.
15 If you read that memo I don't think you'll find
16 any evidence that there was a lot of workers
17 before 1961 who were highly exposed that
18 weren't being monitored. And if you haven't
19 seen that I would advise you to get a copy and
20 look at it.

21 **MR. GRIFFON:** We still have -- there is some
22 caveats. I mean the salvage worker question is
23 -- is one thing, right, the early amount.

24 **MR. RUTHERFORD:** Yeah. I think you addressed
25 that separately though.

1 **DR. NETON:** Yeah, a salvage worker in my mind
2 is -- is more of an internal dose issue than an
3 external. I don't -- I don't have any believe
4 to be that -- they were -- they were working
5 with uranium.

6 **MR. GRIFFON:** Right. Yeah.

7 **DR. NETON:** And so, you know, I just don't see
8 that there's a big difference.

9 **DR. MAURO:** We still haven't done this common
10 sense thing that I've been --

11 **DR. NETON:** Okay.

12 **DR. MAURO:** I keep asking for and I don't know
13 -- I don't know how much value it is. But in
14 my mind it has value. Let me just -- Let me
15 just point that out to you what it is.

16 **DR. NETON:** Sure.

17 **DR. MAURO:** And then, you know, sort of get it
18 off my back. Okay. All I'm saying here is --
19 is at this very nice table, I look at it and I
20 got it to say oh, okay, in 1948 there were
21 2,511 workers, okay --

22 **DR. NETON:** Uh-huh.

23 **DR. MAURO:** -- in Y-12. And we know that 162
24 of them were monitored, okay? And these are
25 the number of records we have. I guess these

1 are weekly records.

2 **DR. NETON:** Yes.

3 **DR. MAURO:** Okay. Now, are they good? Good.

4 **MR. GRIFFON:** Rank them highest to --

5 **DR. MAURO:** All right. So just do me a favor.
6 Just take them high to low, all right? Forget
7 about the distribution.

8 You may see -- you may see some high, three or
9 four high numbers and you may see all zeros.
10 Or if this is the -- whatever -- whatever it
11 is, it is.

12 **DR. NETON:** Okay.

13 **DR. MAURO:** This is what the data say. Then
14 along comes your extrapolation model.

15 **MR. RUTHERFORD:** See where it fits.

16 **DR. MAURO:** Where does it drop in?

17 **MR. RUTHERFORD:** I agree. I see what you're
18 saying.

19 **DR. MAURO:** I mean I look at that and if I see
20 a drop up in the 95th percentile of this
21 distribution I say I don't -- I don't need to
22 know any more. I'm -- I'm --

23 **DR. NETON:** Well, the average value here is
24 around 200.

25 **DR. MAURO:** Right. Yeah, right.

1 **DR. NETON:** Okay. So --

2 **DR. BEHLING:** But he's wanting to check for any
3 outliers to see how many outliers there may be?

4 **DR. MAURO:** Where does it sit? Do we have a
5 whole bunch of people that were hired?

6 **DR. NETON:** Well, that may be but -- well, but
7 -- well, but John because now --

8 **DR. MAURO:** Okay.

9 **DR. NETON:** -- now let's say we find one -- one
10 person who was monitored that exceeds 1,500
11 millirem.

12 **DR. MAURO:** Right.

13 **DR. NETON:** What are you going to do about
14 that? Are you going to state that?

15 **DR. MAURO:** I just want to know it. I guess,
16 no, here's where the judges --

17 **DR. NETON:** If he's monitored, see, now we --
18 we maintain that the highest exposed people are
19 monitored.

20 **DR. MAURO:** Right.

21 **DR. NETON:** Right. So my point is that just
22 because there may be a few people over what
23 we're assigning does not mean, you know, this -
24 -

25 **DR. MAURO:** No. Remember -- Remember then we

1 go back to the conversation we had with Hans
2 before. But we all agree that there were some
3 departments where there may be a large number
4 of people that -- that received substantial
5 exposure but only a portion of them were
6 actually selected for monitoring. There were --
7 -- in other words, all the workers that had the
8 potential for exposure in a given department
9 were not monitored. So -- So -- So --

10 **DR. NETON:** But those workers were included in
11 the distribution. I mean and the percentage
12 would be included, you're right. Right.

13 **DR. MAURO:** But what I'm saying is that those --
14 -- so here we have a worker that was not
15 monitored, came out of a chem department where
16 there was a high exposure but he wasn't
17 monitored. Now -- but that department if you
18 look at it, it was biased high by its very
19 nature.

20 **DR. NETON:** Because it had a high exposure.

21 **DR. MAURO:** Do you see? You understand what
22 I'm saying. Now, to me I say that problem goes
23 away if you do this ranking. And I see that
24 you're coming in at the high end. The
25 extrapolation is bringing you in at the high --

1 and I'm not saying we're in the high end, but,
2 you know, it shows that when you go back and
3 extrapolate there are going to be very few
4 people that will be high end. Now, we all know
5 there's always going to be one or two are going
6 to be higher than you in theory. The thing is
7 where are we coming in? See that's what I call
8 the common sense approach to looking at the
9 data. And that would -- that would convince
10 me. But I'll also say that what we're talking
11 about now is a site profile issue because what
12 I'm hearing is, unless I'm hearing differently,
13 the data -- the question is being put to bed?

14 **MR. GRIFFON:** No.

15 **DR. MAURO:** No? Okay. Well, I -- that's what
16 we should be --

17 **MR. GRIFFON:** It hasn't been. I mean that's
18 what I'm saying. The first 60 -- 50 -- the
19 first 56 right now, you know, hasn't.

20 **DR. MAURO:** Well, then that's what we should be
21 talking about.

22 **MR. GRIFFON:** That's where we're at. I think
23 the modeling is less an issue to me than the
24 question of what we're -- what we're modeling
25 with.

1 **MR. RUTHERFORD:** Yes.

2 **DR. NETON:** We're looking more to '57 to '60 --

3 **MR. GRIFFON:** Yeah, yeah.

4 **DR. NETON:** -- because '61 on everybody was
5 monitored and so we should have data that we
6 can do an -- easily a comparison with that.

7 **MR. GRIFFON:** Well, no, no, no.

8 **DR. NETON:** Okay.

9 **MR. GRIFFON:** '65 and I'm not saying, you know,
10 I think these can help, physics reports for
11 summary data. I don't know if they exist, Jim.
12 I -- I agree with you there but, you know,
13 it's just a -- a couple spot checks from that
14 time period.

15 **DR. NETON:** Okay. I'm -- I'm -- I'm
16 encouraged. I mean if that's where we're at I
17 don't -- I don't --

18 **MR. GRIFFON:** I'm not trying to make a moving
19 target out of this but really we are focusing
20 on '57 for that time period of the SEC but
21 really you're relying on the other and --

22 **DR. NETON:** Right.

23 **MR. GRIFFON:** -- quite frankly if we dig into
24 the '57 through '65 period and see all these
25 manipulations and maneuvers I'd be a little

1 more concerned.

2 **DR. NETON:** Yeah. I've learned -- I've learned
3 my lesson. I'll never presume.

4 **MR. GRIFFON:** You've explained and -- and with
5 good reasons and memos and good -- it seems
6 like good -- you have a good trail --

7 **DR. NETON:** There's a -- There's a -- There's
8 an explanation to what's been going on and I'm
9 --

10 **MR. GRIFFON:** Right. But if that still exists
11 afterwards -- you seem to think that that
12 doesn't exist now and if we look and -- and we
13 see problems still --

14 **DR. NETON:** I can't predict that there is not
15 some new standard that occurred but --

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

17 **DR. NETON:** So I'm encouraged. I mean if
18 that's where we're at, that's fine. I mean we
19 can -- we can go back and -- and look at the --

20 **MR. GRIFFON:** I mean I think that --

21 **DR. NETON:** -- the data that we have in '57
22 through '65.

23 **MR. GRIFFON:** I think that's been my bigger
24 concern throughout is the --

25 **DR. NETON:** I might have misunderstood that.

1 **MR. GRIFFON:** -- the data that we're using
2 rather than the model itself, the data that the
3 models rely on.

4 **DR. NETON:** Well, I think it was important
5 though to establish that the model itself was
6 bound.

7 **MR. GRIFFON:** Right. I agree.

8 **DR. NETON:** I think -- I think that's an
9 important thing to demonstrate.

10 **MR. RUTHERFORD:** Well, I think once -- I think
11 even if you end up tweaking it it's a site
12 profile issue. It's not an SEC issue.

13 **DR. NETON:** That's been my belief for awhile.

14 **MR. RUTHERFORD:** Right.

15 **MR. GRIFFON:** Right.

16 **DR. NETON:** Right. Okay.

17 **MR. GRIFFON:** Well, but -- but the data, you
18 know, we had to get there by looking at the
19 data.

20 **DR. NETON:** Sure, absolutely. No problem.

21 **MR. GRIFFON:** George.

22 **MR. KERR:** The data that -- that John really
23 wants is in a report on the '48/'49 --

24 **MR. GRIFFON:** It is.

25 **MR. KERR:** -- data.

1 **MR. GRIFFON:** Yeah.

2 **MR. KERR:** Because we give the maximum value
3 that is recorded each month. It's not the 95th
4 percentile. We give the 75th percentile but
5 then we also give the maximum. So those --
6 that data is available.

7 **DR. NETON:** There -- There -- Here's some of
8 the data. '48 maximum -- July '48 was about
9 300 millirem.

10 **MR. GRIFFON:** Where -- Where is this report?

11 **MR. KERR:** This is a report -- '47. Well, it's
12 on --

13 **DR. MAURO:** This is -- Okay, this is in
14 02/'47.

15 **DR. NETON:** It's been out since September of
16 2005.

17 **MR. GRIFFON:** 02/'47, okay. Okay. So this is
18 out there.

19 **DR. NETON:** It's been out there for awhile.
20 And -- And it does -- it does have monthly
21 statistics. And I'll tell you right now just
22 at first when you look at this thing it looks
23 like we're --

24 **DR. MAURO:** Well --

25 **DR. NETON:** I won't make any comment. Looks --

1 Looks pretty good to me.

2 **MR. GRIFFON:** Looks okay.

3 **DR. NETON:** Yeah. I don't -- I don't see that
4 there is a --

5 **MR. GRIFFON:** Are those numbers in 02/'47
6 derived from health physics reports or from
7 where? Where are they --

8 **MR. KERR:** From that '48/'49 --

9 **DR. NETON:** Well, it's that '48/'49 data that
10 as the film badge data that we talked about
11 when, you know, Arjun was at one point saying,
12 well, we said it wasn't valid two or three
13 years ago or somebody did and then --

14 **MR. GRIFFON:** Right. So addressed that.

15 **DR. NETON:** The intent of that document was to
16 go back and look at that to see if it could be
17 used to do any kind of comparisons such as
18 we're making. Actually I think the original
19 intent to be honest may have been could we use
20 these data to reconstruct doses.

21 **DR. MAURO:** Unh-unh.

22 **DR. NETON:** And I think we're not doing that
23 now. We're just saying that in looking at the
24 data there's enough information there that we
25 can use to say that this 1,500 millirem that

1 we're projecting to assign is pretty darn good.
2 And it's pretty bounding and and it's -- it's -
3 - it's a plausible number.

4 **DR. MAURO:** I have to apologize. When I asked
5 that question before, do we still have a date
6 of that issue, I was thinking of about what
7 George was saying.

8 **DR. NETON:** Yeah. Yeah.

9 **DR. MAURO:** What was the answer? I mean where
10 are we on that?

11 **DR. NETON:** I agree and, you know, Mark says
12 and it makes sense that we need to go back and
13 look at after '57 and show that we don't have
14 any disconnects there.

15 **DR. MAURO:** Got it.

16 **DR. NETON:** To the extent that we can.

17 **MR. GRIFFON:** But the model itself I think
18 we're -- I mean we're -- we're I mean I think
19 we're getting comfortable with it. And even if
20 there's still some -- some smaller questions on
21 it I think it's really a site profile issue.

22 **DR. NETON:** Yeah.

23 **MR. GRIFFON:** I don't know if everybody agrees
24 but --

25 **MS. MUNN:** I just want to draw a box around

1 that. We're okay with the '52 through '57?

2 **MR. GRIFFON:** No, no. I mean we just got this
3 stuff last night. It seems good as Jim
4 presented it. It seems like they've got --

5 **MS. MUNN:** Well, okay.

6 **MR. GRIFFON:** What? What?

7 **DR. NETON:** No, no. I'm fine. That's fine.

8 **MR. GRIFFON:** I mean --

9 **DR. NETON:** No, no. I just -- I just -- I'm
10 not --

11 **MR. GRIFFON:** You're looking at me funny.

12 **DR. NETON:** Well, I was going to say it seems
13 sort of like I put some spin on it.

14 **MR. GRIFFON:** Well, there's a -- there's a --
15 no, no, no. I'm not -- I'm not suggesting
16 that but there is another problem. I mean you
17 look at this at 11:00 o'clock at night. We
18 don't have identified databases so I'm at a
19 loss how to even compare, you know.

20 **DR. NETON:** My whole point --

21 **MR. GRIFFON:** This is an ongoing issue.

22 **DR. NETON:** My whole point is there are
23 (inaudible) prior to '56 --

24 **MR. GRIFFON:** Yeah.

25 **DR. NETON:** -- and they're -- they're

1 understood and recognized. And given that
2 though, and given that it's all missed dose it
3 looks like we're up here, you know, well above
4 where -- where we believe the workers were
5 receiving dose.

6 **MS. MUNN:** It looks well above any probability.

7 **DR. NETON:** I think it's a very reasonable,
8 plausible approach.

9 **MR. GRIFFON:** I think Arjun's been waiting to
10 say something.

11 **DR. MAKHIJANI:** The back extrapolation and the
12 modeling seemed okay I think, especially with
13 the scaling factor and so forth so I think a
14 lot -- the -- the crucial assumption is one of
15 the things we've been debating and that was
16 part of Harry's statistical analysis and in the
17 review that we did last month, in appendix 3 of
18 the review. And that revolves around
19 interpretation of this table 45-B in your
20 appendix of the evaluation report on page 33.

21 **DR. NETON:** Okay.

22 **DR. MAKHIJANI:** And, you know, if -- if you'll
23 -- if you'll look at that table it's -- it's
24 clear that in many of the departments if you
25 define high exposure potential as high exposed

1 -- high mean exposure, what everybody was
2 monitoring, and rank it that way as one
3 approximate way of understanding which
4 departments have the highest exposure --
5 relatively high exposure potential compared to
6 others. And you look at that table and it goes
7 from 30 millirem average to 107 which is more
8 than a factor of three. And then you look at
9 the percentage of people who were monitored
10 between '56 and '60. Do they correlate -- do
11 the percentage of people increase? Were there
12 consistent -- is there some consistent pattern
13 in the monitoring even among the departments
14 that are clustered at the high end, which is
15 saying the 70 to 100-plus millirem dose. You
16 don't find one. The --

17 **DR. NETON:** Well, I -- I don't have that table
18 in front of me but the first table my -- that I
19 saw in that comparison made no sense to me
20 technically from a -- from a statistical
21 perspective.

22 **DR. MAKHIJANI:** Which table?

23 **DR. NETON:** Well, are you talking about those
24 tables that were generated, those graphs to
25 show --

1 DR. MAURO: Figures 1, 2 and 3?

2 DR. NETON: Yeah.

3 DR. MAURO: I pulled those out. Yeah. Yeah.

4 DR. MAKHIJANI: Right. Because number 3 --
5 number 3 seemed to support our case. Number 1
6 didn't seem to be with merit because I saw no
7 reason to believe the premise.

8 DR. NETON: Well, the workers who were low --
9 the average exposure in workers prior to '56
10 should be the same after '60. I think --

11 DR. MAKHIJANI: No, it's not '56. It's --
12 It's -- It's not -- It's not a question of
13 comparing the average exposure. It's a
14 question of we simply did a correlation. Were
15 -- Were those departments that had high
16 exposures in the '61 to '65 period --

17 DR. NETON: Right.

18 DR. MAKHIJANI: -- also tending to have the
19 relatively high exposures in the earlier
20 period?

21 DR. NETON: Is this figure -- Is this figure
22 1?

23 DR. MAKHIJANI: This is figure 1.

24 DR. NETON: Okay.

25 DR. MAKHIJANI: It's not the horizontal and

1 vertical axes are not on the same sphere.

2 **DR. NETON:** I understand.

3 **DR. MAKHIJANI:** And you're not required to have
4 a slope of one. You're only required to have a
5 relatively strong positive correlation between
6 high values and high values regardless of what
7 those high values actually are.

8 **DR. NETON:** But my question on that graph was
9 what if the department had 1,000 people in it
10 and they monitored one. You're going to dilute
11 it and have a low exposure that after '61 it
12 makes no sense to me, that comparison.

13 **DR. MAKHIJANI:** That -- That's exact-- That's
14 part of the point -- well, there's another
15 graph, of course, that we did.

16 **DR. NETON:** Well, figure 2 I'll grant you. But
17 figure 1 makes no -- no technical sense to me
18 why that comparison is a valid --

19 **DR. MAKHIJANI:** Well, it -- it -- it allows you
20 to determine whether there is a correlation
21 between the -- the departments that indicate
22 high -- the doses that were indicated as
23 relatively high in the department --

24 **DR. NETON:** Only if the departments all have
25 the same number of workers. If you have

1 different number of workers by department
2 you're going to dilute the dose way down. It
3 makes no sense to me what you're doing.

4 **DR. MAKHIJANI:** No, but if -- if -- if your
5 premise is correct that in the '56 to '60
6 period that all of the monitored workers have
7 the highest exposure potential clearly the
8 average in those departments -- first of all
9 the average in those departments for the '56 to
10 '60 period should be higher than the average in
11 the '61 to '65 period and that is clearly not
12 the case. I will give you -- I will read you
13 an example. The -- The --

14 **DR. NETON:** I don't have it in front of me.

15 **DR. MAKHIJANI:** Look. Department 2162, 50
16 workers, average 17.1, 36 percent monitored.
17 The average post when everybody was monitored,
18 47.6.

19 **DR. NETON:** But --

20 **DR. MAKHIJANI:** Wait. I'll give you one with a
21 lot of workers. Department 2776, 8.9 percent
22 of the quarters were monitored. The mean dose
23 was 20.6 when they partial monitored but the
24 mean dose when there was universal monitoring
25 was 90.7. That -- That -- That contradicts

1 the case that the people in the earlier
2 periods, that's why that correlation is
3 important is indicates that in some departments
4 that had high exposure potential you had a lot
5 of monitoring and in others you didn't. So,
6 you know, your premise actually was indicated
7 to not be correct.

8 **DR. NETON:** But I would argue that the doses
9 that you're quoting there are well below the
10 detectible doses of the badge exchanges. So
11 you're really in a statistical wheeze, Arjun.
12 There is no way that you can validly compare
13 doses that are 100 millirem when you've got a
14 badge that -- that reads 30 millirem and is
15 exchanged weekly. It makes no sense.

16 **DR. MAKHIJANI:** Well, quarterly dose is only
17 20.

18 **DR. NETON:** But my point is that you -- you've
19 got built in there a lot of statistical issues
20 with detectability of the radiation itself.
21 You're comparing -- if you put air bars on
22 those comparisons I guarantee you they're going
23 to be like this. (Indicating.) They make no
24 statistical sense at all to me. I could do
25 this. I could go back and show that. But what

1 I'm saying is you're looking below the
2 detectability of the measurement systems
3 themselves and trying to make comparisons at
4 zero.

5 **DR. MAKHIJANI:** Those were the data that you're
6 using and including in your 147 workers.

7 **DR. NETON:** No, they were --

8 **DR. MAKHIJANI:** You are using -- you are using
9 data from workers who were monitored in the '56
10 -- that's the piece -- that's the only piece
11 that really concerns me in this --

12 **DR. NETON:** Right.

13 **DR. MAKHIJANI:** -- is this piece.

14 **DR. NETON:** Right.

15 **DR. MAKHIJANI:** Is your -- There's -- To me
16 as I look at this information both in regard to
17 proportion of people who are monitored in the
18 various departments and -- and the average
19 doses that are indicated here is that there's a
20 very mixed bag as regards who was being
21 monitored in the '56 to '60 period.

22 **DR. NETON:** I don't think that that analysis
23 says that at all. I think you've -- you've got
24 statistical issues with what you've been
25 comparing. We compared the highest exposed

1 workers who had really high doses and the
2 highest exposed workers continued to be the
3 highest exposed workers across the -- the
4 graph. So you're -- you're up there in the
5 level of doses that are meaningful
6 statistically. You're comparing doses of
7 workers who could have received, who knows?
8 Again like I said, 30 millirem per badge
9 exchange, 50 weeks, you've got a potential dose
10 per worker of 1.5 rem, and you're comparing 20
11 millirem averages. It's -- It's not a valid
12 comparison I don't think. I think if you put
13 air bars on there you can't come to any -- any
14 valid comparison there. I mean it's a good
15 statistical analysis but I think that they did
16 not understand the limitations of the
17 measurement devices that were used when they
18 did the analysis. That's my opinion.

19 **DR. MAKHIJANI:** Why, when 90. -- let -- let's
20 just take -- if -- if that -- and I'm quite
21 open to not seeing this right. And I looked at
22 this as much as you have obviously.

23 **DR. NETON:** Yeah.

24 **DR. MAKHIJANI:** Let's if we can -- if we can
25 just understand this one department, 2776.

1 1,137 workers; number of monitored quarters
2 with 8.9 percent. The mean dose in the '56 to
3 '60 period per quarter is 20.6 millirem. Same
4 department with the universal monitoring was
5 90.7 millirem. All right. Now, in the second
6 period it clearly had an above detectable dose
7 --

8 **DR. NETON:** But the average --

9 **DR. MAKHIJANI:** -- of 90.7.

10 **DR. NETON:** But it's built up of a bunch of
11 numbers that -- that aren't above the
12 statistical --

13 **DR. MAKHIJANI:** But a lot of people had to have
14 --

15 **MR. GRIFFON:** Maybe they just built up because
16 the LOD was assigned --

17 **DR. NETON:** Exactly. What I'm saying --

18 **MR. GRIFFON:** -- Zeros assigned --

19 **DR. MAKHIJANI:** A lot of people had to have
20 doses above 30 millirem in order to make up
21 this average as 90. If the limit of detection
22 is 30 --

23 **DR. NETON:** Right.

24 **DR. MAKHIJANI:** -- it couldn't be that 70
25 percent of the people were assigned 30 and

1 you're coming up with an average of 90 because
2 then you've got some very, very high exposed
3 people.

4 **DR. NETON:** But the point is, Arjun, you're
5 assigning missed dose to all those workers that
6 are now monitored. That's my point. You're
7 giving all those workers who didn't receive --

8 **DR. MAKHIJANI:** That's just 30 millirem per
9 badge exchange per quarter.

10 **DR. NETON:** Times 13 is 400 millirem.

11 **MR. GRIFFON:** Six months or?

12 **DR. NETON:** These are per quarter doses.

13 **DR. BEHLING:** These are quarterly doses.

14 **DR. MAKHIJANI:** These are quarterly doses.

15 **DR. NETON:** Right. But what I'm saying though
16 is the 90 millirem quarterly dose includes a
17 lot of missed dose.

18 **DR. MAKHIJANI:** But only 30 millirem.

19 **DR. NETON:** For more workers though. You've
20 added a lot more workers --

21 **DR. MAKHIJANI:** But not the early ones.

22 **DR. NETON:** -- (Inaudible) positive --

23 **DR. MAKHIJANI:** -- relevant in the average.

24 The -- The -- If you -- If you have an
25 average of 90 millirem you have to have a very

1 significant number of workers --

2 **DR. NETON:** No.

3 **DR. MAKHIJANI:** -- who have above --

4 **DR. NETON:** No.

5 **DR. MAKHIJANI:** Please hear me out. Now, if
6 you have an average of 90 millirem in a group
7 of workers and the limit of detection is 30
8 then you're going to have a large number of
9 workers who have had doses above the limit of
10 detection. And then you can't come up with an
11 average of 90 unless you have real -- a few
12 real outliers --

13 **DR. NETON:** Okay. Let me -- Let me --

14 **DR. MAKHIJANI:** -- which I'm excluding.

15 **DR. NETON:** Let me see if I understood what the
16 comparison was. Prior to '56/'57, eight
17 percent of the workers are monitored or
18 something like that. So I have badge results
19 for those and I'm assigning them missed dose or
20 whatever to come up with my average but I'm
21 dividing that value by the entire work
22 population --

23 **DR. MAKHIJANI:** No, no.

24 **MR. GRIFFON:** No, no. No. Workers.

25 **DR. NETON:** I divide it by the monitored

1 workers?

2 **DR. MAKHIJANI:** Yes.

3 **DR. NETON:** Well, then that makes the
4 comparison --

5 **DR. MAKHIJANI:** This is the mean dose -- this
6 is the mean dose for -- for monitored workers.
7 It would make no sense to divide it by average.

8 **DR. BEHLING:** They should go down. In
9 principle they should go down.

10 **DR. NETON:** But not if you're measuring 1,100
11 workers and assigning them all missed dose.

12 **DR. BEHLING:** No.

13 **MR. GRIFFON:** Let me make a -- can I make a --

14 **DR. NETON:** I know. They monitored everybody
15 after --

16 **MR. GRIFFON:** Can I make a suggestion here?
17 Hold on. Hold on. Let's -- it might be a good
18 time for a ten-minute break?

19 **DR. MAKHIJANI:** Okay.

20 **MR. GRIFFON:** And during the break maybe Jim
21 can look at -- do you have this tape on file?

22 **DR. MAKHIJANI:** No, I don't have it.

23 **MR. GRIFFON:** Maybe let's take ten and let Jim
24 look at this table during the break with Arjun
25 and we'll come back and --

1 (Whereupon, a recess was held from 11:05 a.m.
2 to 11:20 a.m.)

3 **MR. PRESLEY:** Hey, Mark.

4 **MR. GRIFFON:** Yeah.

5 **MR. PRESLEY:** I'm on the line. It's Bob.

6 **MR. GRIFFON:** Hi, Bob.

7 **MS. MUNN:** Good. How are you feeling?

8 **MR. GRIFFON:** Yeah, how are you doing?

9 **MR. PRESLEY:** Much better.

10 **MS. MUNN:** Good.

11 **MR. GRIFFON:** That's good.

12 **MS. MUNN:** Great.

13 **MR. PRESLEY:** I'm on for about 30/45 minutes.

14 **MS. MUNN:** Are you behaving yourself?

15 **MR. PRESLEY:** Yes, ma'am. I'm sitting here
16 laying back with my feet up in a chair.

17 **MS. MUNN:** Good.

18 **MR. PRESLEY:** Like to never found a telephone
19 up here to use.

20 **DR. WADE:** I appreciate that. Bob, this is
21 Lew. You understand that you're conflicted on
22 Y-12. You're certainly welcome to stay on the
23 line and listen to the discussion.

24 **MR. PRESLEY:** I would love to.

25 **DR. WADE:** Thank you.

1 **MR. GRIFFON:** Okay. Jim, I think I want to
2 just, you know, let's -- let's try to wrap this
3 issue and discussion up and see what we have
4 remaining.

5 **DR. NETON:** I just have one -- one comment. In
6 the interim during the break we were able to
7 pull out a piece of documentation on the
8 particular department number that Arjun was
9 talking about, department 2776. And it looks
10 for a two-year period here starting in '58 they
11 were removed from the program completely, from
12 monitoring. So that may --

13 **MR. GRIFFON:** Two year? Two year?

14 **DR. NETON:** I think it's starting in '58.

15 **DR. MAKHIJANI:** April of '58.

16 **DR. NETON:** April of '58 through '60. They
17 were taken off the monitoring program
18 completely because they didn't feel the workers
19 had sufficiently high exposures. Anyway, that
20 -- that's something we can probably talk about
21 when we -- when we look through that particular
22 example that Arjun raised.

23 **MR. GRIFFON:** Yeah, okay. And during the break
24 we did have some discussion on these particular
25 tables. We -- We needed an opportunity to let

1 Jim see which tables SC&A was looking at and
2 vice versa so -- but I did want to try to at
3 least get a path forward here. And I think my
4 sense is that number one is a remaining
5 question on data -- data reliability, '57
6 through '65 if NIOSH can find, you know --
7 support that case a little better I think that
8 would be useful. I think the work group and
9 SC&A still have to digest the information you
10 provided for that '52 through '57 period as far
11 as data validation goes but it looks like you
12 have a fair -- fair amount of data there. I
13 mean, you know, that looks like a good, strong
14 case for that data although many twists and
15 turns with some of these memos that I was
16 reading. But at least there's some information
17 there. But I can -- SC&A and the work group
18 need a chance to look at that a little more.
19 And then on the model part I think nothing
20 remains as far as NIOSH analysis but I think
21 SC&A wants to -- to further look at the tables
22 in the evaluation report and I would say
23 compare it to -- to the previous reports that
24 George has provided on looking at the maximum
25 exposed workers pre and post-'61 is the -- is

1 how the analysis is laid out.

2 **DR. NETON:** Right.

3 **MR. GRIFFON:** And I mean I think many of us
4 feel that -- that what from the model
5 standpoint, what to -- if anything it being a
6 site profile issue more than an SEC issue. But
7 I think we want to cross the T, dot the I on
8 that issue. And I think we're -- we're close
9 to that but, you know.

10 **DR. NETON:** Well, I still, you know -- we've --
11 we've been at this juncture for awhile and I
12 guess I still point out that if it's coming
13 down to the situation where SC&A and the
14 Advisory -- the working group is not
15 comfortable assigning the geometric mean of the
16 back extrapolated distribution then it's a
17 matter of how much that is tweaked to cover the
18 maximum exposed worker I think. And if that's
19 the situation we're at then to me that -- that
20 doesn't bear on the SEC process and, you know -
21 -

22 **MR. GRIFFON:** And I think the final resolution
23 is -- is are we -- are we convinced at least in
24 -- in large part the highest exposed workers
25 were monitored. And some of these -- this

1 table raises some questions I think that we
2 need to at least explore a little further. I
3 mean I think we've been pretty convinced.
4 You've pointed out some pretty good arguments
5 that that is the case.

6 **DR. NETON:** Right.

7 **MR. GRIFFON:** I think we need to just close that
8 and then we're -- I'm -- I'm speaking for
9 myself anyway, if that's closed then -- the --
10 the regression analysis, that piece of it, it
11 looks okay.

12 **DR. NETON:** Okay.

13 **MR. GRIFFON:** All right.

14 **DR. NETON:** I agree with that.

15 **MR. GRIFFON:** So --

16 **DR. NETON:** All right.

17 **MR. GRIFFON:** I agree with that.

18 **MS. MUNN:** Yeah, I want -- I have two questions
19 that I'd like to ask you. If we come to the
20 conclusion that some of the issues reveal that
21 there are not necessarily applicable to the SEC
22 but are site profile issues, are we simply
23 postponing dealing with this? Does it come
24 back to us?

25 **MR. GRIFFON:** Well, we still -- we have a lot

1 of site profile matrix issues from -- from --

2 **MS. MUNN:** I understand.

3 **MR. GRIFFON:** Right. So we -- we would be --
4 it's not -- I mean I guess it's -- it's just a
5 timing thing. We're trying to make as quick of
6 a determination on the SEC petition as we can.
7 So if we feel that they have enough information
8 to maximum plausible doses then we don't need
9 to go any further for this SEC closeout
10 process. That's my opinion, Jim. Is that --
11 so we are -- we are putting it aside for the
12 meantime only because we wanted to --

13 **MS. MUNN:** But --

14 **MR. GRIFFON:** Yeah.

15 **MS. MUNN:** It comes back.

16 **MR. GRIFFON:** It -- It could come back. But
17 it could -- it could be that John and -- and
18 Arjun and -- and the SC&A folks and -- and the
19 work group say, you know, the regression
20 amounts looks good the way it is and we can
21 close it up completely. I don't know. But I
22 think -- I think we want to at least get to the
23 point where we can say, you know, this -- this
24 really -- we're not completely sure but we're
25 pretty -- we're sure it's not an SEC issue.

1 Let's put it over here as a potential site
2 profile issue and, you know.

3 **MS. MUNN:** Okay. One other point of
4 clarification. Now, are there going to be
5 additional -- in your mind are there going to
6 be additional years following the '65 time
7 frame where we're going to feel any -- to be
8 reviewing the data in the same manner that
9 we've done to this point?

10 **MR. GRIFFON:** The data reliability questions?

11 **MS. MUNN:** Yes.

12 **MR. GRIFFON:** I mean I think since the model --
13 the co-worker models used that period -- up to
14 '65, correct? So I would say, you know, that's
15 the primary period of interest would be the SEC
16 period but also to work the modeling period.

17 **DR. NETON:** Co-worker model after '61 is really
18 the distribu-- well, after '57 is the
19 distributions, the -- the normal distributions
20 by year --

21 **MR. GRIFFON:** By year.

22 **DR. NETON:** -- of themselves. No extrapolation
23 is --

24 **MR. GRIFFON:** Right.

25 **DR. NETON:** It's a traditional co-worker model

1 much as you see at other sites.

2 **MR. GRIFFON:** Right.

3 **DR. NETON:** Because at that point we have
4 confidence that they do fit lognormal
5 distributions and something can be done with
6 them.

7 **MR. GRIFFON:** And that's after what year?

8 **DR. NETON:** After '57 -- '56. Starting in '57
9 we have AAFC and the frequency charts that Hans
10 has with him from report 32, the data appear to
11 fit very nicely what you'd call normal --

12 traditional lognormal distributions. And so
13 then you would be assigned either the geometric
14 mean or the 95th percentile depending upon --

15 **MR. GRIFFON:** The co-worker back extrapolation
16 relies on what period of monitoring data?

17 **DR. NETON:** '50-- last quarter '56 through '65.

18 **MR. GRIFFON:** Okay. So that -- I think that's
19 --

20 **DR. NETON:** That's what --

21 **MR. GRIFFON:** That's the interest. That's the
22 primary interest.

23 **DR. NETON:** Right. But -- But again I would
24 point out that the back extrapolation model is
25 based on this 147 workers. I think really

1 that's where the emphasis needs to be placed.
2 Out of those 147 workers representative of the
3 maximum exposed workers in that time period.
4 And if they are then the model --

5 **MR. GRIFFON:** Well, then is -- But if that's
6 the modeling side then the data reliability
7 side is --

8 **DR. NETON:** Different issues.

9 **MR. GRIFFON:** -- data reliability.

10 **DR. NETON:** Now, the department issue that
11 Arjun has raised again, maybe those 147 workers
12 need to be looked at in that light. Do you
13 know what I'm saying?

14 **MR. GRIFFON:** Yeah.

15 **DR. NETON:** Because we -- we relied on a very
16 select subset of workers to develop that model
17 and -- and they're the crux of the model. If -
18 - If -- If we can convince folks that the
19 model used people who were in the maximally
20 exposed categories then I think we're okay.

21 **MR. GRIFFON:** That part goes away, right. I
22 agree.

23 **DR. NETON:** So --

24 **MR. GRIFFON:** Then it becomes mainly a data
25 reliability issue.

1 **DR. NETON:** Right.

2 **MR. GRIFFON:** Which is I think where we're --
3 where we're -- we're real close to that.

4 **DR. NETON:** yeah. And it's data reliability
5 '57 --

6 **MR. GRIFFON:** '57 to '65. And give us -- give
7 the Board -- the work group and -- and SC&A an
8 opportunity to look at your '52 through '57
9 stuff that you've provided.

10 **DR. NETON:** Yeah. And again, that's getting
11 close, but again one needs to look at the
12 context of the projected curve versus, you
13 know, what we can glean from that data.

14 **DR. MAKHIJANI:** Jim, do you have the
15 departmental breakdown of the 147 workers?
16 That might make this job a lot simpler.

17 **DR. NETON:** I agree.

18 **DR. MAKHIJANI:** Compare that to the --

19 **MR. KERR:** We have work descriptions. Those
20 you already have.

21 **MR. GRIFFON:** Yeah, we've -- we've been given
22 that.

23 **DR. MAKHIJANI:** But do we have the -- we have -
24 -

25 **DR. NETON:** You have the worker num-- worker

1 ID's and those department numbers are listed in
2 the database so you should --

3 **DR. MAKHIJANI:** Oh, so I could go back and --

4 **DR. NETON:** I don't know. I think --

5 **MR. KERR:** You asked -- You asked previously
6 for job descriptions.

7 **DR. MAKHIJANI:** Yeah.

8 **MR. KERR:** But what you asked for -- and you
9 got a breakdown in terms of job descriptions.

10 **DR. MAKHIJANI:** Right.

11 **MR. KERR:** And you realize most of them are
12 uranium workers.

13 **DR. MAKHIJANI:** Right.

14 **MR. KERR:** They're machine shop worker, workers
15 and special workers. Makes up almost the whole
16 147.

17 **DR. MAKHIJANI:** Right.

18 **MS. MUNN:** Are you saying now we want to plot
19 them another way?

20 **DR. MAKHIJANI:** In this context because, well,
21 this issue didn't arise earlier because we
22 didn't have the evaluation report. But the
23 analysis that we've done subsequent to that
24 publication was off the evaluation report where
25 the doses are broken out by department number.

1 **MS. MUNN:** Right.

2 **DR. MAKHIJANI:** And so the question about were
3 the highest people mon-- the potential exposure
4 people monitored arose in the departmental
5 context only because we saw that table and --

6 **MS. MUNN:** Sure.

7 **DR. MAKHIJANI:** -- realized it. We can have
8 that breakdown or we could simply go to the
9 table and it might become -- I think -- I think
10 LaVon -- LaVon --

11 **DR. NETON:** Yeah, I think we can do that.

12 **DR. MAKHIJANI:** Okay.

13 **DR. NETON:** My -- My -- My real question is -
14 - looking through the O-drive recently I -- I
15 saw -- there's a spreadsheet, a list of the 147
16 ID numbers I think so maybe --

17 **MR. GRIFFON:** I think that's in -- I've seen --

18 **DR. NETON:** But -- But it doesn't have --

19 **MR. GRIFFON:** -- I know I have --

20 **DR. NETON:** -- department codes but that's
21 tractable through the -- the database which --

22 **MR. GRIFFON:** Which gets us back to the
23 database. I think -- I think that's the only
24 other thing I would ask for from NIOSH's side
25 is if we can once and for all get the Y-12

1 access databases iden-- identified data. I
2 mean it -- it -- it would just make this so
3 much easier to -- to --

4 **DR. NETON:** Well, we've given you the access
5 database for all the years we're working with,
6 I think through '65 now.

7 **MR. GRIFFON:** Through '65, right but no
8 identifiers.

9 **DR. NETON:** Well, it's got ID number.

10 **MR. GRIFFON:** Doesn't have --

11 **DR. NETON:** You can't -- You can't track it to
12 a case number.

13 **MR. GRIFFON:** We can't track it to like these
14 names, this list of names that you have, things
15 like that. Just to spot check to get comfort
16 with this data you've just provided in -- in
17 real time. I think it would be much easier.

18 **DR. NETON:** Just to insert the identifier in
19 the database?

20 **MR. GRIFFON:** Yeah. I mean you, you know, for
21 the people extracted from there.

22 **DR. NETON:** Yeah, sure. I think we can do
23 that. It's just the whole database --

24 **MR. GRIFFON:** I'm not trying to create work
25 either.

1 **DR. NETON:** No, no, no, no.

2 **MR. GRIFFON:** I think it probably exists, you
3 know, and --

4 **DR. NETON:** Yeah, I think -- I think we can do
5 that.

6 **MR. GRIFFON:** I don't want to make work.

7 **DR. NETON:** Yeah. The -- The -- It's not a
8 real reluctance on our part to provide the
9 whole database but if it's a sequel database
10 and you have to download these tables to
11 convert them to Access, it's virtually
12 impossible I've been told to make that entire
13 sequel database, which is a relational
14 database, into Access tables that are useable.
15 You almost -- these Access ta-- database --
16 files almost are the result of queries of this
17 huge database which the data may be all over
18 the place. You know what I'm saying?

19 **MR. GRIFFON:** Yeah, yeah, yeah.

20 **DR. NETON:** A relational database has, you
21 know, many, many, many tables and key field
22 indices. So what may appear to be very simple
23 -- here's the year-end data, here's the guy's
24 name -- may have actually been pulled from a
25 number of different locations from a sequel

1 frame which only runs on, you know, several
2 sequels.

3 **MR. GRIFFON:** So when Bill Tankersley did those
4 comparisons he probably was using a sequel
5 database directly?

6 **DR. NETON:** I don't know. Well, he can pull,
7 you know -- he can ask their -- their computer
8 people to give me -- give me, you know. It's
9 very much like the database. You know, we have
10 all kinds of stuff in there but to get an
11 answer, how many people were working between
12 19-- you know.

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

14 **DR. NETON:** It takes some programming.

15 **MR. GRIFFON:** I mean I'm not trying to create
16 additional work. I was thinking, well, it's
17 probably a product that's --

18 **DR. NETON:** But the answer to your original
19 question is can we put identified information
20 in there.

21 **MR. GRIFFON:** Okay.

22 **DR. NETON:** I don't see why we shouldn't be
23 able to.

24 **MR. GRIFFON:** All right. And -- And put a
25 urinalysis in. You know, might as well do both

1 of them.

2 **DR. NETON:** Okay.

3 **MR. GRIFFON:** So is there any other -- other --
4 other things on issue one? Do you still have
5 stuff on issue one?

6 **DR. NETON:** No. No.

7 **MR. GRIFFON:** No?

8 **DR. NETON:** No, I --

9 **MR. GRIFFON:** The last little bit, maybe just
10 as a -- from a presentation standpoint, because
11 we really do need to move through the other
12 seven issues. Do you -- can you give us a
13 sense of some of these memos that you sent last
14 night? Particularly there was one on the --

15 **DR. NETON:** Yeah.

16 **MR. GRIFFON:** -- I thought they indicated that
17 --

18 **DR. NETON:** Yeah.

19 **MR. GRIFFON:** -- there's some analysis they --

20 **DR. NETON:** 1954.

21 **MR. GRIFFON:** -- had done and that was
22 transposed and they put the penetrating in the
23 skin and vice versa.

24 **DR. NETON:** Yeah. Actually ORAU discovered --

25 **MR. GRIFFON:** I'm not sure how they got there

1 but --

2 **DR. NETON:** ORAU discovered it after they took
3 receipt of the electronic data for study --

4 **MR. GRIFFON:** Yeah.

5 **DR. NETON:** -- that the 1954 penetrating doses
6 appeared to be inordinately high compared to
7 the bracketing years '52 and '53 and '55. And
8 on investigation they -- they worked with Hap
9 West who was -- many of you maybe know was a
10 long-time HP at the site and ran the program
11 for awhile. He's since deceased. But they
12 determined from several different avenues that
13 the -- the data would transpose for penetrating
14 and shallow in 1954. So they went and redid
15 the database to match what they believed to be
16 the truth for that year. And so the CER
17 database then, which is -- actually the Y-12
18 database would have been updated and then the
19 CER database would have followed -- was
20 changed.

21 **MR. GRIFFON:** I think that how they got there
22 was the part I was -- and skimming this over
23 last night --

24 **DR. NETON:** Well, you know, I skimmed -- I
25 didn't read that report real closely either.

1 **MR. GRIFFON:** But I mean it was clear to me
2 early on he said that he was unable to find raw
3 records so they had to I think he said tap his
4 own memory and others that worked in that time
5 period and --

6 **DR. NETON:** So there are some, you know --

7 **MR. GRIFFON:** All right. We'll leave -- I mean
8 I think we should look at that memo but just as
9 a follow-up on the other -- other question --

10 **DR. NETON:** The other memos spoke to beta, you
11 know, the data up here in the beta gamma
12 column. And there's an instruction to the --
13 and that just sort of validates this IBM
14 keypunch thing that we were talking about that
15 the IBM cards only had a column for beta gamma
16 prior to '55 actually. And they -- they were
17 instructing them to create a new column, one
18 for gamma and one for beta, and there was some
19 instruction and actually a list of workers who
20 they believe the beta -- gamma exposures should
21 be pulled out of the beta column and moved into
22 the gamma field. But it was pretty much based
23 on their work assignment, work location as best
24 --

25 **MR. GRIFFON:** And that memo had a list of --

1 **DR. NETON:** Workers.

2 **MR. GRIFFON:** -- the guys' numbers or I think
3 it --

4 **DR. NETON:** It was workers, the Social Security
5 numbers.

6 **MS. MUNN:** Worker names and --

7 **DR. NETON:** The Social Security numbers, right.

8 **MR. GRIFFON:** So those'll be in the
9 (inaudible).

10 **DR. NETON:** Right.

11 **MR. GRIFFON:** Okay. It might be interesting to
12 look at the --

13 **DR. NETON:** Right.

14 **MR. GRIFFON:** Well, I think year is by
15 department?

16 **DR. NETON:** Right. And then -- then there were
17 other instructions of memos in there about how
18 they wanted to see the data for certain years
19 like, oh, there was a recollection by Hap West
20 of the years as to what monitoring practices
21 were in places and how -- the recording
22 practices in particular. This is where I got
23 the information for '50, '51. They didn't put
24 any -- they put all zeros. Starting in '52
25 they recorded missed dose and, you know, and it

1 goes up through the '60s. So --

2 **MR. GRIFFON:** In spite of --

3 **MR. KERR:** In --

4 **MR. GRIFFON:** Sorry.

5 **MR. KERR:** I was going to say something on --
6 in one of those memos which is getting -- it
7 was a '57 memo where they're getting ready for
8 '58, where you need to know cumulative exposure
9 --

10 **MR. GRIFFON:** Right.

11 **MR. KERR:** -- and you need to ensure that it
12 didn't exceed so much per year and according to
13 worker's age. They tell you how they got --
14 how they went back and summed, you know, the
15 doses.

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

17 **MR. KERR:** And if you'll see the ratio they
18 used it was the number of badges over the
19 number of records.

20 **MR. GRIFFON:** Right.

21 **MR. KERR:** So if they had a damaged badge or
22 somebody didn't turn a badge in or something
23 they tried to correct for missed dose in
24 getting those S-rem and P-rem --

25 **MR. GRIFFON:** Yeah, I did see that correction.

1 **MR. KERR:** You saw --

2 **MR. GRIFFON:** The number of badges over the
3 number of records, yeah.

4 **MR. KERR:** Yeah. But it was for missed dose,
5 the thought that they were taken into account.

6 **DR. NETON:** I think they're interesting
7 reading.

8 **MR. GRIFFON:** Yeah.

9 **DR. NETON:** And I do think they show that the
10 level of effort they were trying to put into
11 make it correct. But also it does point out
12 that there are issues in that database but --

13 **MR. GRIFFON:** Well, right. Just -- And some -
14 - somewhat it clarified some things that were
15 recorded at different time periods so it was
16 useful for that.

17 **MR. KERR:** Yeah. One other thing, Mark, and I
18 have just this one comment. If you go back and
19 look at say a '53 memo or a '54 memo, realizing
20 that they made some of these changes at a later
21 date, you may see some other discrepancies
22 between the two values because of the
23 corrections that were made later. And see,
24 there may be some minor -- minor discrepancies
25 may be coming in that way.

1 **DR. NETON:** But again --

2 **MR. GRIFFON:** One thing I was going to ask you
3 then. I think some of this analysis probably
4 answered this question for you but one of the
5 earlier things we raised I think at the last
6 meeting was the P-millirem question.

7 **DR. NETON:** Uh-huh.

8 **MR. GRIFFON:** And did -- what -- what's the
9 upshot of that? I mean you -- you have the
10 result of why it is the gamma dose in I think -
11 - I thought you mentioned somewhere in my
12 reading I thought I saw something about that
13 but maybe not.

14 **DR. NETON:** Well, '50/'51 clearly there was
15 nothing in any of those columns --

16 **MR. GRIFFON:** Right.

17 **DR. NETON:** -- so we understand now why that
18 was the case.

19 **MR. GRIFFON:** Because it was all put in S?

20 **DR. NETON:** It was all put in S. Well, yeah.
21 And also it was -- even if they were going to
22 record it was missed dose wasn't listed and so
23 it was unlikely that anyone would have received
24 greater than 1.5 rem I guess in that period. I
25 don't recall now, you know, --

1 **MR. GRIFFON:** I just sort of see a P-millirem
2 versus --

3 **DR. NETON:** -- early estimates.

4 **MR. GRIFFON:** Yeah. I mean you remember the
5 issue that was brought up?

6 **DR. NETON:** Yeah, sure.

7 **MR. GRIFFON:** Yeah, yeah.

8 **MR. KERR:** There was a problem back early
9 because they assigned sometimes in the -- in
10 the later years they assigned missed dose based
11 on where they thought the person primarily had
12 a gamma exposure problem or a beta exposure
13 problem. But sometimes they wrote down -- put
14 this 50 millirem over here in the gamma and
15 didn't put it in the beta column. So anyhow
16 you got this problem when you sum 'em up
17 because that -- your deep penetrating were the
18 contributing, your S-millirem as well as your
19 P-millirem. If they only put it over here in
20 the P-millirem column and summed up, it was
21 possible you'd get P-millirem doses bigger than
22 the S-millirem doses.

23 **DR. NETON:** That's -- That's true.

24 **MR. KERR:** And they went back later and tried
25 to correct for this if they saw the P-millirem

1 was greater than the S-millirem. Then they set
2 employee equal. And the reason they did that,
3 if you go back and look in some of the
4 claimants' files you're going to get down and
5 you're going to see sometimes in the early
6 years where the S-rem and the P-millirem are
7 the same.

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

9 **MR. KERR:** And that was kind of a correction
10 they tried to make because they may not have
11 assigned any, you know --

12 **MR. GRIFFON:** Since they weren't sure?

13 **DR. NETON:** Yeah. In fact my recollection
14 looking through the database, after '56 I was
15 hard-pressed to find values that didn't sort of
16 add up and make sense. In other words --

17 **MR. GRIFFON:** That's correct. After '56 we had
18 --

19 **DR. NETON:** If you go in there -- It makes
20 sense from a health physics perspective what's
21 in the various columns.

22 **MR. GRIFFON:** And looking at it after '56,
23 yeah.

24 **DR. NETON:** They all add up.

25 **MR. GRIFFON:** In other words '52 to '55 --

1 **DR. NETON:** Yeah, '52 to '55, and again, you
2 know --

3 **MR. GRIFFON:** The gamma P-rem -- I mean the
4 skin and the -- and the S-rem always -- always
5 met, almost always I think.

6 **DR. NETON:** Might, yeah.

7 **MR. GRIFFON:** From '52 to '55 anyway. I'm
8 going by memory which --

9 **DR. NETON:** And in fact it's never -- there is
10 never a column -- I went through almost every -
11 - every point last week and there's -- I don't
12 think there's ever a column where the S-
13 millirem is larger than any of the other
14 columns. In other words, if there's a gamma
15 dose the S-millirem is always larger or equal
16 to the beta column. I went through it and it
17 made -- it made sense to me that the -- the
18 bracketing dose, and this was partly related to
19 the fact that they recorded beta gamma doses in
20 the same column, so you'll never see a --

21 **MR. GRIFFON:** I mean this is kind of a minor
22 item.

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

24 **MR. GRIFFON:** The gamma versus P-millirem if --
25 if you can just maybe follow up on that.

1 **DR. NETON:** Yeah.

2 **DR. BEHLING:** We may have at times at some
3 facilities -- I'm not sure if Y-12 necessarily
4 -- where they actually pulled out the gamma
5 component of the shallow dose and reported as a
6 beta dose which means that there can be
7 incidents where the beta dose is clearly less
8 than the deep dose if there's no beta component
9 because they basically pulled out the gamma
10 component and reported it as not shallow dose
11 but beta dose.

12 **DR. NETON:** That was incorrect, but yeah. I've
13 seen that out at facilities. You're right.
14 But I don't see that in -- I -- I looked
15 through pretty carefully the database and I
16 didn't see any case where the shallow dose was
17 exceeded by the gamma dose. It always was --
18 was larger than the gamma dose.

19 **MR. GRIFFON:** That makes sense.

20 **DR. MAKHIJANI:** For Y-12 I think that is --

21 **DR. NETON:** For Y-12 -- see, originally I was
22 thinking, well, that's -- that's certainly
23 bounding. If you use all shallow doses because
24 that's the largest dose in any of the columns,
25 then you've got a bounding analysis there. But

1 I don't think you need to go there. But I
2 wanted to satisfy myself that if there was this
3 recording practice of putting beta and gamma in
4 the same column is there an instance where --
5 where the gamma dose is larger and the beta
6 dose is not? So -- But I can't explain any
7 more than that.

8 **MR. GRIFFON:** Anything else on issue one?

9 (No response)

10 **MR. GRIFFON:** So we've got those -- some action
11 items on that then.

12 **DR. NETON:** Right.

13 **ISSUE 2: THORIUM BUILDINGS**

14 **MR. GRIFFON:** Issue two.

15 **DR. NETON:** Okay. Thorium buildings.

16 **MR. GRIFFON:** Thorium buildings.

17 **DR. NETON:** Okay. This --

18 **MR. GRIFFON:** Let's go into it and maybe, I
19 don't know if people want to -- how about
20 taking lunch at 1:00 or is that okay?

21 **DR. NETON:** That's fine by me.

22 **MR. GRIFFON:** Is that okay with everyone? Then
23 maybe we'll miss any potential crowd in the --

24 **DR. NETON:** I thought it was pretty busy today
25 actually.

1 **MR. GRIFFON:** Yeah. Okay.

2 **DR. NETON:** Okay. Thorium --

3 **DR. WADE:** There's coffee here by the way.

4 **MR. GRIFFON:** Okay.

5 **DR. NETON:** Okay. It'll keep me -- keep me
6 going 'til 1:00 o'clock. I'm not really a big
7 coffee drinker but these meetings, I just feel
8 like I -- I need -- I need the extra energy.

9 **MR. GRIFFON:** Do you want a couple minutes to
10 get a cup of coffee?

11 **DR. NETON:** I can make it okay.

12 **MR. GRIFFON:** As long as you're okay. I'm
13 going to get one while you're talking.

14 **DR. NETON:** Okay. Well, once I'm done I'll get
15 one. In the thorium area of course the -- the
16 issue is have we -- have we bracketed all the
17 buildings that had thorium in them in our, you
18 know, class that we're adding to the SEC. Or
19 more correctly have we -- have we bracketed the
20 buildings that had thorium exposure potential
21 in the SEC period. You know, we -- we have to
22 be careful that because a building had thorium
23 listed as being in its contents that, you know,
24 it was really an exposure hazard, yes or no.
25 To address that question we sent some people

1 back to the records area to look at the thorium
2 -- the so-called thorium ledgers. These are
3 ledgers that -- that kept track of material
4 balance of the nuclides that -- that were of
5 interest and thorium is one of those. And ORAU
6 has gone back and looked at these ledgers and
7 identified now all potential buildings that --
8 or I have to be careful. Not necessarily
9 buildings. Sometimes material balance areas of
10 where thorium was actually -- to which thorium
11 was actually distributed during the SEC period.
12 This is fairly late-breaking news so I'm going
13 to have to rely on Mel Chew. Is Mel on the
14 phone?

15 **MR. CHEW:** Yes, I am Jim.

16 **DR. NETON:** Okay, Mel. Mel, could you flesh
17 out for us where we are with the ledgers and
18 the thorium buildings, please?

19 **MR. CHEW:** Glad to.

20 **DR. NETON:** Unfortunately I don't have any
21 handout for --

22 **MR. CHEW:** Thanks to Jack Beck and Company I
23 faxed you this morning two lists here. One is
24 a list of buildings that we -- from the ledgers
25 that we have identified where thorium is in the

1 1950s which is the SEC period. And then a
2 second list that includes the additional
3 buildings from the 1960s. And let's focus in
4 on the area where the SEC period is here. The
5 table -- there's a chart that I think you have
6 in your hand there, Jim, that talks about --
7 goes out to the account numbers and you're
8 absolutely correct. The account numbers really
9 relate to locations where material balances
10 were segregated for control and accountability
11 material, accountability of the thorium. It is
12 very notable that the accountability is down to
13 a gram level in quantity. Let me just try to
14 give a summary without going through the long
15 story. And we can go through I mean a detailed
16 analysis. In the 1950s we have identified
17 eight buildings in the 1950 time frame -- '50s
18 time frame which is the SEC period of which
19 there are -- I mean we have added some
20 additional buildings because small samples that
21 have went -- have been identified into
22 analytical areas, even down to the like 11
23 grams, 16 grams and 454 grams. So we have
24 identified these particular eight buildings
25 that we have indicated that thorium was

1 present. Okay. So --

2 **MR. GRIFFON:** Mel, are these -- you're --
3 you're saying the '50s but you mean '48 through
4 '57 or --

5 **MR. CHEW:** Well, I think that even in the '48
6 through '50 I think there was the first
7 indication of any thorium was like one and a
8 half kg's in the '49 period, Mark, that showed
9 up in the X-10 electromatic research area 9204-
10 3.

11 **MR. GRIFFON:** But I mean --

12 **MR. CHEW:** -- four kilograms was listed as a
13 total quantity. There's an account called
14 control and control sort of is the -- by our
15 analysis is where the total quantity of thorium
16 is within Y-12 and then they break it out into
17 the particular areas where they are located.
18 So control is sort of like this is the total
19 quantity we know of is at Y-12. So I hope I
20 answered your question. We do have indication
21 where in 1949 there were some in the R&D area
22 and also in the electromatic research area of
23 which we think the -- our control is like --
24 like 57 kilograms in total here. But
25 encompassing that -- and -- and so that goes

1 through 1950s all the way through '57 is the
2 table that I submitted to -- to Jim on this
3 particular time. The -- The quantities in --
4 are in kilograms and we can clearly identify --
5 we have listed all of the buildings through
6 that entire period from '49 to the 1950s,
7 probably including '59, that would be, you
8 know, those buildings that would have contained
9 the -- has -- has quantities of thorium
10 present. So we're going to revise -- I think,
11 Jim, this is your call -- I think we're going
12 to revise the -- this particular list in the
13 SEC evaluation report to reflect the -- these
14 particular buildings that we did not originally
15 include, including some of the analytical
16 laboratories which contained small quantities.
17 I'm going to stop here. Jim, do you want to
18 pick it up from here?

19 **DR. NETON:** Right. I'm not sure we've actually
20 made that decision at this point although it's
21 certainly an option.

22 **MR. CHEW:** Right. This is your call. That's
23 right. I'm --

24 **DR. NETON:** And -- And, you know, this is
25 fairly new information. I just -- I just -- I

1 got this last night and didn't have time to
2 look at it but --

3 **MR. GRIFFON:** Can we -- can you make copies --

4 **DR. NETON:** Yeah, we'll --

5 **MR. GRIFFON:** -- during the break or --

6 **DR. NETON:** Yeah, we'll get copies.

7 **MR. CHEW:** The bottom line, Mark, is that -- is
8 the -- the base using the official ledgers that
9 is in the (inaudible), you have identified all
10 the specific locations in the time period we're
11 talking about and what quantities of thorium
12 has been at the -- at those particular
13 locations here. And we have also not only
14 accounted for the accountability number which
15 is the identification of the MVA, but also a
16 little bit about the location description like
17 research laboratory, extraction and muffling,
18 analytical lab, electromatic researching and
19 ORNL reactor technology division. So I think
20 what I'd like to say is that we think we have
21 all of the thorium accounted for in the Y-12
22 area for those particular buildings and
23 locations during the 1950s, '49.

24 **DR. NETON:** And I'd like to give credit to --
25 to the folks who -- who worked -- worked

1 through these ledgers. It was easy to find the
2 -- the first few up through '55. I think '56
3 and '57 took some doing. They weren't in the
4 same location. But we were able to find a
5 ledger for every single year which was good
6 work.

7 **MR. GRIFFON:** We appreciate that.

8 **DR. NETON:** Now, Mel, when you say there's
9 eight buildings you've identified then I assume
10 then there's overlap with these -- the five
11 that we've listed in the SEC period already.

12 **MR. CHEW:** That is correct.

13 **MR. GRIFFON:** And what are the three additional
14 that aren't on the list?

15 **MR. RUTHERFORD:** Three additional.

16 **MR. CHEW:** Let's see. I don't have that in
17 front of me here. Sorry about that. But I
18 think 9203 had 11 grams of material. I'm just
19 going to take a guess which one. I should have
20 had that little bit of overlap here. But I can
21 iden-- I can identify --

22 **MR. RUTHERFORD:** Mel, this is Bomber -- this is
23 Bomber. I've got it. 9203 is an additional
24 building.

25 **MR. CHEW:** Okay. Thanks.

1 **MR. RUTHERFORD:** 92-3 is an additional
2 building.

3 **MR. CHEW:** All right.

4 **MR. RUTHERFORD:** And 9995 is the third
5 additional building.

6 **MR. CHEW:** Yeah. I already got that, Bomber.
7 And -- And I kind of -- I can give -- we have
8 the maximum quantities --

9 **MR. GRIFFON:** Yeah.

10 **MR. CHEW:** -- in any given year that I just had
11 to flip to for myself just for this discussion
12 if necessary here. For example, like Bomber
13 just mentioned, 9995 they had 436 grams. The
14 9203 that Bomber mentioned was 11 -- 11 grams
15 for example, and I showed it for 1954.

16 **MR. GRIFFON:** Are those both labs? They must
17 be labs.

18 **MS. MUNN:** 11 grams, had to be.

19 **MR. RUTHERFORD:** The 11 gram was definitely a
20 lab. I know that.

21 **MR. GRIFFON:** 9995 I know was a lab.

22 **DR. NETON:** It's an assay lab -- assay lab.

23 **MR. RUTHERFORD:** 9201-3 was an ORNL reactor
24 technical division and that -- they picked up
25 significant quantities in '57. But they --

1 they actually had quantities back in 1952.

2 **MR. GRIFFON:** What do you mean significant
3 quantities?

4 **MR. RUTHERFORD:** Well, I mean I would --

5 **DR. NETON:** 9201-3, in '57 they picked up 7,800
6 kilograms of material.

7 **MR. GRIFFON:** Alpha 3 -- Alpha 3's clearly not
8 a research lab. I mean it's not a lab.

9 **DR. NETON:** Right. Yeah, these other two,
10 again, I'll reserve judgment. We have to
11 rethink this but when you -- again, as I
12 preface my remarks, if you -- if you have 11
13 grams of material in an analytical laboratory
14 you're clearly calibration type standards.
15 Now, how finely we want to split this is -- in
16 terms of what the potential exposure is I don't
17 know. I mean we need to -- we need to rethink
18 this and --

19 **MR. GRIFFON:** Let me ask if that listing -- I
20 mean I'm glad, you know, it got to the ledgers
21 but were there other buildings, Arjun, that you
22 found in these other previous memos that you
23 saw that were mentioned? Maybe we can figure
24 out if there's a discrepancy --

25 **DR. MAKHIJANI:** Can I look at the break?

1 **MR. GRIFFON:** Okay. Okay. We'll get back
2 after lunch. Maybe we'll be at a place to take
3 a break at noon.

4 **DR. MAKHIJANI:** (Inaudible)

5 **MR. GRIFFON:** The other -- The other question
6 I had outside of the buildings in looking at
7 some of the case data it's -- it's apparent to
8 me that there is mainly a reliance on
9 department information and this -- this is
10 probably more of a deal out question but it
11 gets back to the how do you determine question,
12 you know. And if you're -- how do you find out
13 if someone was in one of these five or seven or
14 how many other buildings? And the onus comes
15 onto DOL so maybe we need to bring Pete Turcic
16 back in the mix.

17 **DR. NETON:** I think you're right.

18 **MR. GRIFFON:** But if you just have department
19 information then I know from doing some work
20 out there that the departments are not
21 necessarily one to one linkage with buildings.
22 So then you, you know, do they conservatively
23 assume and some of these are big process
24 buildings so then you get into a large number
25 of claimants being put into this group which

1 may or may not belong in that group, you know.
2 So...

3 **DR. MAKHIJANI:** Mark -- Mark, I have --

4 **MR. GRIFFON:** Anyway but you -- you don't have
5 -- you can't shed any light on --

6 **DR. WADE:** We will ask Pete or someone
7 representing DOL to come to the meeting
8 prepared to answer those questions.

9 **MR. GRIFFON:** You don't know if anyone's done
10 any department building sort of analysis. I
11 don't think that's been done. Some of the work
12 has been --

13 **MR. RUTHERFORD:** I -- I -- I would bet that
14 Bill Tankersley and some of the -- done some of
15 the studies, has done some of that -- that
16 work.

17 **MR. PRESLEY:** Hey, Mark?

18 **MR. GRIFFON:** Yeah.

19 **MR. PRESLEY:** Can I talk?

20 **DR. WADE:** It's up to the group. Are you going
21 to share information based upon your expertise
22 at the site, Bob?

23 **MR. PRESLEY:** Yes.

24 **DR. WADE:** And not opinion? It's okay with me
25 if -- is it okay with you, Mark and Wanda?

1 **MS. MUNN:** Yes.

2 **DR. WADE:** Okay. If you -- If you want to
3 share --

4 **MR. GRIFFON:** I -- I don't want to violate our
5 own ruling. That's the only thing.

6 **MS. HOWELL:** As long as he's speaking as a site
7 expert only.

8 **MR. GRIFFON:** Right.

9 **DR. WADE:** If you speak as a site expert only
10 and offer only facts as you know them, that
11 would be acceptable, Robert.

12 **MR. PRESLEY:** Okay. What you're talking about,
13 the departmental charges and buildings?

14 **MR. GRIFFON:** Yeah.

15 **MR. PRESLEY:** Just like the fabrication
16 department. You've got -- it doesn't --
17 somewhere in that time frame there was
18 somewhere between 16 and 21 different shops.
19 And those different shops could have had the
20 same department number.

21 **MR. GRIFFON:** Right.

22 **MR. PRESLEY:** The same thing with your chemical
23 workers, everything else. So you cannot really
24 go by department number as to what building
25 that is in.

1 **MR. GRIFFON:** And then from what I understand,
2 Bob, they -- they, even within like say a
3 maintenance department, these guys were telling
4 me they -- they often bid out on jobs in
5 various areas --

6 **MR. PRESLEY:** That could be.

7 **MR. GRIFFON:** -- within a year so they could be
8 shifting around.

9 **MR. PRESLEY:** And that's not only just in Y-12.
10 They could have gone to ORNL or 225 because we
11 did maintenance. You had Y-12 maintenance
12 people working in all three plant sites.

13 **DR. WADE:** We will ask you all to --

14 **MR. GRIFFON:** -- ask you all about --

15 **DR. MAKHIJANI:** Well, I have --

16 **MR. GRIFFON:** Oh, you found your other --

17 **DR. MAKHIJANI:** I found my list. We -- Now,
18 we -- you've looked at our evaluation report
19 review of April 24th. We do have time frames
20 on these so, you know, if you eliminated these
21 as not belonging in the right time frame. But
22 there were in 9204-4 -- no, sorry -- 9201-5 and
23 there was some thorium -- there was a storage
24 building, 9720-5. And there's a thorium 230
25 associated building, 9215.

1 **MR. GRIFFON:** And 9215 may have been a later
2 period.

3 **DR. MAKHIJANI:** Yeah, I'm not sure about the
4 period. We could not nail down the periods.
5 Obviously all -- all of these --

6 **MR. CHEW:** Arjun, I think Bomber has that list
7 I sent him. We have identified those
8 particular buildings that you have just
9 mentioned in the 1960s. I just caught some of
10 them. You mentioned 9201-5, 9215. What was
11 the other one you had mentioned? I'm sorry. I
12 apologize.

13 **DR. MAKHIJANI:** 9720-5.

14 **MR. CHEW:** 9720-5.

15 **MR. GRIFFON:** Storage area I think you said it
16 was.

17 **MR. CHEW:** Storage area.

18 **MR. GRIFFON:** (Inaudible)

19 **MR. CHEW:** Okay. We don't -- We didn't have
20 that on the list from the 1960s but it wouldn't
21 surprise me if 92-- a storage area would, you
22 know, where the material would originally come
23 into because we know large quantities came into
24 the -- into Y-12 and was waiting to be
25 processed here.

1 **DR. MAKHIJANI:** Yeah, I think that may be the
2 one building where I don't remember the
3 document but it seems to me that maybe thorium
4 was received there.

5 **MR. CHEW:** Oh, that makes sense. We have a one
6 called account number control. There was no
7 building listed but we couldn't find that and -
8 - and I'm just going to take a guess that may
9 relate to that. But we could track that
10 number, account number down, that MBA number
11 down to make you sure that we are tracking 192
12 -- 9720-5. The other two you mentioned we
13 clearly have identified --

14 **DR. MAKHIJANI:** Okay.

15 **MR. CHEW:** -- the thorium being present in the
16 1960s and not in the 1950s.

17 **DR. MAKHIJANI:** Okay. So that would resolve
18 that.

19 **MR. CHEW:** Pretty much, Arjun. Appreciate it.

20 **DR. MAKHIJANI:** And 9204-4 I guess may be the
21 last one on my list.

22 **MR. CHEW:** Yeah, 9204-4 is also listed in the
23 1960s.

24 **MR. GRIFFON:** In the 60s.

25 **MR. CHEW:** Okay. You have those in front of

1 you, right Bob?

2 **MR. PRESLEY:** Yeah.

3 **MR. CHEW:** Good.

4 **DR. MAKHIJANI:** Okay. So then that would --

5 **MR. GRIFFON:** So we'll check that one --

6 **MR. RICH:** In the 1960s were buildings
7 identified by extensive air samplings?

8 **MR. GRIFFON:** Bryce Rich.

9 **MR. RICH:** The main production areas, the
10 thorium production areas.

11 **MR. GRIFFON:** Right.

12 **MR. RICH:** There are nine of them, nine
13 buildings. But as has been indicated, three of
14 those overlap, 9202, 9206 and 9203. That's the
15 1950s.

16 **DR. NETON:** Yeah, with the exception of this
17 9201-3 it seems like, you know, we covered the
18 areas in the SEC --

19 **MR. GRIFFON:** Yeah.

20 **DR. NETON:** -- class that actually did
21 something, you know, process-wise with thorium
22 and --

23 **MR. GRIFFON:** You have a senior laboratory.

24 **DR. NETON:** Yeah, laboratories. And, you know,
25 I'm -- I'm still right with this point not

1 certain where we're going to land on that
2 issue. I mean but the 9201-3 is something
3 NIOSH needs to take into consideration.

4 **MR. GRIFFON:** Yeah. Sure. And maybe free up
5 this 9720-5.

6 **DR. WADE:** Yeah, I got it down.

7 **MR. GRIFFON:** And that's -- that's it.

8 **DR. WADE:** I think -- I think --

9 **MR. GRIFFON:** Other than that I think --

10 **MR. RICH:** 9201-3 was one of the old beta
11 calutron buildings.

12 **DR. MAKHIJANI:** The last issue here doesn't
13 relate to a building but to the S3 pond. Now,
14 we -- we looked at the document that NIOSH
15 pointed us to and we noted, you know, between
16 our two reports, and we noted that the burial
17 ground data included S3 pond discards before
18 1974 so we weren't able to parse whether the S3
19 pond was used in the SEC period or not. And I
20 don't know if you have been able to. I think
21 that's the last issue we have.

22 **MR. RUTHERFORD:** Well, I'll jump in a little
23 bit here. We do have indication that there was
24 some material that was discarded in 1952.
25 We're still tracking identities. This table is

1 not very clear on that and -- and so if we can
2 leave that S3 pond issue or burial ground issue
3 as something that we're still looking into.

4 **MR. GRIFFON:** As for exposures of the people
5 that would have been handling the waste, is
6 that --

7 **MR. RUTHERFORD:** Yes.

8 **MR. CHEW:** I'd like to on that note, I'd like
9 to distribute first a memo from Union Carbide I
10 have in my hand from radiation safety because
11 the question came up several times about the --
12 considering the thorium contaminated in the
13 uranium salvage operations that had potentially
14 went into the pond. And it's called the
15 maximum thorium concentration in process
16 salvaging. It does some assessment of work
17 they felt the thorium -- additional thorium
18 exposure may be as a potential exposure pathway
19 and so we do have information that that was
20 studied. I will make sure that's going to be
21 in your hand.

22 **DR. NETON:** Yeah, let's make sure we get that
23 distributed, Mel.

24 **MR. CHEW:** Okay.

25 **DR. NETON:** Great.

1 **MR. GRIFFON:** Other issues on the thorium
2 topic? I mean is there -- what about the --
3 have we closed out the issues of the other
4 (inaudible) that were used to outside of these
5 buildings or -- or could we have covered it all
6 in these buildings? Is that --

7 **DR. NETON:** Well, I think the material balance
8 ledgers certainly --

9 **MR. GRIFFON:** Right.

10 **DR. NETON** -- if the thorium didn't get shipped
11 there unless we believe the ledgers to be
12 inaccurate I think we've covered the waterfront
13 under thorium --

14 **MR. GRIFFON:** I think so, too.

15 **DR. NETON:** -- activities.

16 **MR. GRIFFON:** Me, too.

17 **DR. MAKHIJANI:** I would agree with that
18 especially in light of what was said by
19 Department of Labor at the Denver meeting.

20 **MR. GRIFFON:** Yeah.

21 **DR. MAKHIJANI:** Since we're not dealing with
22 the uranium workers for the thorium, that's
23 gone away so I think --

24 **DR. NETON:** Yeah, I believe so.

25 **MR. GRIFFON:** Right.

1 **MR. GRIFFON:** It makes it a lot easier for all
2 of us.

3 **DR. MAKHIJANI:** So we covered the buildings
4 then.

5 **DR. NETON:** Yeah.

6 **MR. GRIFFON:** As long as we cover, yeah, who
7 worked in those buildings.

8 **DR. NETON:** Yeah.

9 **MR. GRIFFON:** That's the department building
10 issue, yeah.

11 **DR. NETON:** Yeah.

12 **DR. MAURO:** I have just got --

13 **MR. GRIFFON:** John.

14 **DR. MAURO:** Just again for clarification, what
15 we have is a circumstance where at some point
16 waivers define the class in a way that the
17 boundaries are very clear that who falls into
18 the class and who doesn't and it has something
19 to do with, what I'm hearing, with the
20 buildings and perhaps to types of activities
21 and locations within buildings. And a class
22 will be defined in those terms. I'm trying to
23 create a model in my head to -- to separate out
24 where we might still have some residual SEC
25 issues. Would that be --

1 **DR. NETON:** I think you heard -- I think you
2 heard Pete Turcic pretty clearly say on the
3 record that, you know, if -- if there was no
4 way to parse those areas out at all that they
5 would -- they would -- they would consider
6 working in the building period as evidence of
7 thorium exposure potential.

8 **MR. GRIFFON:** Of thorium exposure, right.

9 **DR. MAURO:** Then that puts to bed the only
10 concern I have.

11 **MR. GRIFFON:** I think he did -- he might have
12 parsed it a little bit saying that, you know,
13 if there was any indication job-title-wise or
14 whatever that they would --

15 **DR. NETON:** Right.

16 **MR. GRIFFON:** -- like an administrative person
17 that was likely not in the process.

18 **DR. NETON:** Well, even then, yeah.

19 **MR. GRIFFON:** Even then, yeah.

20 **DR. NETON:** Say for instance if there was a
21 cafeteria in the basement of the building that
22 you entered and never went into the workplace -
23 -

24 **MR. GRIFFON:** Right.

25 **DR. NETON:** -- I think they might make that --

1 **MR. GRIFFON:** But otherwise we can assume it's
2 very clear?

3 **MR. RUTHERFORD:** If you look at the lab, assay
4 lab, if we -- if we ended up putting the assay
5 lab -- if we decided that that would include
6 that. You know, you wouldn't necessarily look
7 at a newspaper person if there's only 11 grams
8 in the building and their doing, you know, so -
9 -

10 **DR. NETON:** You've got -- I mean the definition
11 was couched in the sense that, you know, you
12 had to have -- should have been monitored or
13 were monitored for exposure to thorium so
14 that's a --

15 **MR. GRIFFON:** But see, they took the thorium
16 part out of that definition.

17 **DR. NETON:** He -- He did in the sense that if
18 you can't tell it's not going to be an issue.
19 This takes care of Arjun's concern about co-
20 located workers.

21 **DR. MAURO:** You have a pretty good sense then
22 of what that boundary should have been
23 monitored should be. In other words, you're in
24 a - you're going to be in a position where
25 you're going to help Pete say where that line

1 is drawn.

2 **DR. NETON:** And I think Pete's already said
3 that. If there's any potential for thorium
4 exposure at all, pretty much the way I --

5 **DR. MAURO:** Then it's clean.

6 **DR. NETON:** Yeah, I don't want to interpret.

7 **DR. MAURO:** Then it's clean. If it's not clean
8 then it's a walkaway.

9 **MR. GRIFFON:** And the only part that I'm saying
10 isn't quite clean is -- is that how do you
11 determine if they ever were in the building?

12 **DR. NETON:** That's another issue.

13 **MR. GRIFFON:** It's not for us to -- it's a DOL
14 question.

15 **DR. NETON:** Uh-huh.

16 **MS. MUNN:** And the thorium balance record makes
17 it a lot easier.

18 **ISSUE 3: RECYCLED URANIUM (RU)**

19 **MR. GRIFFON:** I think we're on to issue three
20 if -- Recycled uranium.

21 **DR. NETON:** Wanda, could you start passing them
22 around?

23 **MS. MUNN:** Uh-huh.

24 **DR. NETON:** I have some -- a handout here that
25 was put together with ORAU. Bryce Rich

1 particularly was involved in -- in piecing this
2 together. This -- I'll briefly cut to the
3 chase on this. ORAU has raised a concern that
4 I think fundamentally SC&A is not necessarily
5 opposed to the defaults that we're using for
6 the recycled uranium for process workers with
7 the -- with the materials. They did raise a
8 concern that in the cleanup of the recycled
9 material that arrived you generate waste
10 streams, ancillary waste streams that by
11 definition have at some -- to some degree
12 enriched the uranium -- I mean the contaminants
13 relative to the uranium. And so we put
14 together a -- a write-up on this. Bryce Rich
15 has done -- done a good job on this. Some of
16 it goes through the issues of -- of what are we
17 doing and why our -- our conservative values
18 are -- are -- are high already for the workers
19 who are handling the material. We picked the
20 highest -- the highest contaminant level to
21 deal with the workers. I think that at the end
22 we talk about the waste streams that were
23 generated and it is true that the waste stream
24 values are higher and I think we actually have
25 measurements for those values. But it is our

1 opinion, at least my opinion at this point that
2 the waste streams are wet process waste
3 streams. They were handled wet and dispensed
4 to the -- the disposal areas as such and so the
5 potential for inhalation exposure to this
6 enriched sort of -- bad choice of words -- this
7 enhanced amount of transuranic material was --
8 was very low and in fact our -- our default
9 assumption using the highest concentration that
10 came in the door is -- is probably a reasonable
11 amount to assign to the workers. With that
12 I'll ask if Bryce has anything to add and
13 comment if that's a fair assessment of where --
14 where we are or where he believes he wrote --
15 what he believes he wrote up anyway.

16 **MR. RICH:** I -- In more of perhaps background,
17 Y-12 was unique in the area of recycled uranium
18 from the standpoint that they -- most of the
19 contaminants came in with very high enriched
20 uranium recycle materials out of -- out of
21 (inaudible) and SRS. Plutonium 238 became the
22 dominating plutonium isotope. They also
23 handled a lot of other LEU and DU because of
24 operational requirement, all of which had
25 recycled uranium. As Jim indicated we -- we --

1 we defaulted at the maximum level to add to the
2 uranium intake value since those were so
3 extensive. In -- In the area of the
4 enrichment there was -- there was some, maybe
5 30 percent of the -- the recycled uranium -- I
6 should back up and say that the -- the -- the
7 very -- VHEU and the HEU that came in was --
8 was pretty much all chemically extracted again
9 primarily not to remove the uranium
10 contaminants or the recycled uranium
11 contaminants but primarily to remove the other
12 contaminating non-radiological metals such as
13 copper and nickel and the like. About 30
14 percent of the recycled uranium contaminants
15 did go out in the raffinates. But put in
16 perspective on the history of the plant,
17 something like a tenth of a gram of -- less
18 than a tenth of a gram of plutonium went out
19 and relatively small quantities of neptunium,
20 technetium and -- and the like. Another unique
21 factor was that there was some thorium 228 that
22 came in as a contaminant as a result of the
23 production in irradiating very high enriched
24 uranium fuels. We think we've adequately
25 covered the -- the additional exposure that

1 could have occurred as a result of the recycled
2 uranium contaminants including the -- the
3 raffinate waste processing. It'll -- It'll --
4 It'll be perhaps as you look at the description
5 I guess I'll have to admit that because of the
6 complexity we -- we perhaps all a little more
7 descriptive treatment, a little more of a -- a
8 -- a narrative in the -- in the technical basis
9 document which we tried to keep concise but
10 perhaps too concise.

11 **DR. MAURO:** The only comment I -- I have is by
12 way of clarification. I did read this write up
13 on the way over and I got the sense that the
14 answer is fairly simple. Notwithstanding the
15 wet processing side of it is that the default
16 method that's currently in the Y-12 TBD had
17 adopted a set of assumptions which bound any of
18 the scenarios that we were trying to struggle
19 with. And if that's the case --

20 **DR. NETON:** I think you're right. If you look
21 at table 5-6 is where you're getting that?

22 **MR. GRIFFON:** It's -- Yeah.

23 **DR. NETON:** If you look at the raffinate value
24 of the footnote the maximum plutonium in the
25 raffinate according to this table is 30 per

1 gram of sludge. That's pretty low. I mean you
2 -- you would have to inhale a fairly large
3 amount of sludge to -- to get any kind of
4 exposure. As a matter of fact --

5 **MR. RICH:** As a matter of fact, that is right.
6 The -- However -- And -- And the -- may not
7 -- and I think it was clear in the write-up
8 that was provided that we did not apply the
9 maximum value to the few people that were
10 involved actually in transferring, you know,
11 the handling the transfer and the disposal in
12 the S3 ponds. Those maximum models to the
13 entire work class nor to the individuals
14 themselves because they did other jobs, too.

15 **DR. NETON:** Oh, yeah.

16 **MR. RICH:** And -- And -- And so as a
17 consequence, you know, if you want to go -- if
18 you want -- and -- and a further default to
19 accommodate that one rather small -- it only
20 took 50 hours a week -- 50 hours a year to do
21 that job.

22 **DR. NETON:** Say how many?

23 **MR. RICH:** Pardon me?

24 **DR. MAKHIJANI:** Fifty hours --

25 **MS. MUNN:** Fifty hours a year.

1 **MR. RICH:** Fifty hours a year. And this is --
2 this is very well documented in the Y-12
3 recycled uranium mass balance report. And so
4 we didn't devote -- devote the entire -- at
5 that level which would -- which would go in
6 about a factor of five increase. And -- And
7 that increase by the way, because we defaulted
8 high, factor of ten in all of the other
9 defaults above the -- above the average values
10 we felt like that would -- that would certainly
11 cover that -- that relatively short term
12 operation at the increased level for the
13 raffinates. Take a look at it and see what --

14 **MR. GRIFFON:** A factor of ten?

15 **DR. MAKHIJANI:** Bryce, can you explain the
16 thing because I had a question about that
17 factor of ten that you reduced the maximum
18 value by in your example.

19 **MR. RICH:** Yeah, the range of, you know, the
20 analytical range, result range through the
21 plant for all of the -- the contaminant levels,
22 the -- the maximum range to which we defaulted
23 was in the -- in the range of a factor of ten
24 or higher than the average.

25 **DR. MAKHIJANI:** And what's the basis for that

1 factor of ten?

2 **MR. RICH:** What's the basis? Because it was
3 just the upper range of the distribution.

4 **MS. MUNN:** The maximum value.

5 **MR. RICH:** Yes, the maximum value.

6 **MS. MUNN:** To represent --

7 **MR. RICH:** And the reason for that -- the
8 reason for that is that it -- it -- it's almost
9 impossible to identify any individual as being
10 associated with a process that represented --

11 **MR. GRIFFON:** Process --

12 **MR. RICH:** -- any -- any -- any given
13 distribution.

14 **MR. GRIFFON:** Is it --

15 **MR. RICH:** And as a consequence you're almost
16 forced to default to the maximum since -- since
17 this is a -- a missed dose they didn't do
18 plutonium or neptunium analysis but at the
19 levels we're talking about and the extent they
20 didn't do an amount of bioassay at the -- at
21 the levels for that purpose. They -- They
22 controlled on the basis that the incoming
23 limits placed on recycled uranium contaminants
24 was agreed to to increase the overall hazard
25 level by no more than ten percent. This did

1 not include concentrating mechanisms primarily
2 of which was the liquid extraction process.
3 And with that in mind it -- we feel that we've
4 adequately defaulted on the high side and as --
5 and the application of the default will provide
6 a claimant-favorable result.

7 **MR. GRIFFON:** Bryce, you mentioned the DOE Y-12
8 recycled uranium report.

9 **MR. RICH:** Yes.

10 **MR. GRIFFON:** I'm -- I'm going by memory here
11 but it seems to me there were other operations
12 listed in there as at least moderate in -- they
13 had executive summary sort of table where they
14 --

15 **MR. RICH:** Yes.

16 **MR. GRIFFON:** -- indicated the relative
17 potential for neptunium and plutonium
18 exposures.

19 **MR. RICH:** Yes, they figured out a matrix that
20 --

21 **MR. GRIFFON:** And there are other operations
22 other than the sludge handling that --

23 **MR. RICH:** Oh, yes. They had 36 fundamental or
24 major operations associated with the processing
25 of recycled uranium materials. There were over

1 100-plus different types of operations but they
2 -- they all grouped within 36 categories and
3 they analyzed and -- and then provided that
4 data within those 36 categories. But three of
5 which were the -- the recycled uranium -- no,
6 the -- the waste product streams not only to
7 the S3 pond but WETF waste processing that
8 occurred after I think '86 or so. And then of
9 course, there's some -- some burial of the --
10 the material also.

11 **MR. GRIFFON:** You believe all those -- your
12 sense is that all those operations fit within
13 this range in table 5-6 that you've presented?

14 **MR. RICH:** They fit within the -- the -- the
15 fundamental default range that I indicated with
16 the exception of the --

17 **MR. GRIFFON:** Of the raffinate.

18 **MR. RICH:** -- of the raffinates. And the
19 raffinates being again in that matrix they --
20 they -- they made an effort to estimate the
21 amount of time associated.

22 **MR. GRIFFON:** Yeah.

23 **MR. RICH:** And -- And also the probability of
24 airborne activity and -- and that -- that all
25 taken into account we felt we were defaulting

1 accurately.

2 **MR. GRIFFON:** And when you said you talk about
3 this maximum, is that -- that's -- is that in
4 table 5.6 or --

5 **MR. RICH:** No, they're in there, several
6 tables.

7 **MR. GRIFFON:** Yeah.

8 **MR. RICH:** I think it's table .6 but then
9 there's also a table in the appendix B under B-
10 3 of the 4 pages. And a good share of the
11 default or good share of the materials comes
12 from that source also.

13 **MR. GRIFFON:** How about within your TBD though,
14 within the TBD's I have these excerpts here I
15 think.

16 **MR. RICH:** Yes.

17 **MR. GRIFFON:** Table 5.6, 5.7, 5.8 --

18 **MR. RICH:** Right.

19 **MR. GRIFFON:** -- that maximum you were
20 discussing, is that -- and then you said you
21 might divide by ten in some instances because
22 the maximum --

23 **MR. RICH:** Yeah, I -- I think we -- well, that
24 -- that's true. If -- If you were to -- the -
25 - the -- the best estimates -- but -- but there

1 are other criteria for doing best estimates so
2 I think that'll come out of the -- the -- that
3 part of the TBD. That's actually dose
4 reconstruction determination so if that's
5 clear.

6 **MR. GRIFFON:** I think so, yeah.

7 **DR. MAKHIJANI:** Well, I'm still a little
8 puzzled about what actually happens. Is you --
9 you have the maximum value and there's a
10 distribution that doesn't seem to include the
11 maximum value because the maximum value belongs
12 to a very limited set of processing, three out
13 of whatever, 37.

14 **MR. RICH:** I took -- took the maximum
15 distribution for the entire sets --

16 **DR. MAKHIJANI:** Right.

17 **MR. RICH:** -- all of them.

18 **DR. MAKHIJANI:** So the range -- the range that
19 you've shown in table 5-6, .11 to 4.5 for
20 instance for plutonium, does not include that -
21 - the raffinate value.

22 **MR. RICH:** I -- That's what I said.

23 **DR. MAKHIJANI:** Right.

24 **MR. RICH:** It will not include raffinate.

25 **DR. MAKHIJANI:** Bear with me. I haven't gotten

1 to the question yet. The -- The -- When you
2 do a dose reconstruction you -- you use that
3 range, .11 to 4.5 as a --

4 **MR. RICH:** You use -- You use the maximum, a
5 maximum derived from that range.

6 **DR. MAKHIJANI:** A maximum. So you use 4.5 or -
7 -

8 **MR. RICH:** Yes.

9 **DR. MAKHIJANI:** So you use 4.5 from that range?

10 **MR. RICH:** Yes.

11 **DR. MAKHIJANI:** Where did the 62 come in?

12 **MR. RICH:** The 62 is recognized as a -- as a --
13 a -- a range for a given raffinate stream that
14 was -- that was handled by -- as a wet process
15 stream that was discharged directly to the S5
16 pits or later to the WETF processing system.
17 And -- And in the S5 pits -- S3 pits -- ponds
18 they mixed again with -- with other uranium,
19 mostly LEU and DU from other processes, a lot
20 of uranium. And so as a consequence any
21 exposure at that point -- then the -- the --
22 the parts per billion compared to uranium would
23 -- would go down again. See, in the raffinate
24 stream the uranium was so cleanly removed that
25 it was only parts per million of -- per gram of

1 material such that the use of the 62 parts per
2 billion -- parts per -- yeah, parts per billion
3 plutonium, is -- is really meaningless because
4 there's precious little uranium in it.

5 **DR. MAKHIJANI:** Right.

6 **MR. RICH:** And so there are two reasons for not
7 using that -- that -- that level in the
8 raffinate stream directly as a default because
9 it's -- it's not meaningful in terms of the
10 fact there's precious little uranium there in
11 the first place plus the fact that, you know,
12 there was a total of a tenth of a gram, total,
13 put into the ponds and -- and the fact that
14 there's 62 parts per billion is -- is not a --
15 not a consistent default based on the -- the
16 overall default philosophy that has been
17 developed. Plus the fact that that it was such
18 a small time-wise and exposure potential
19 process.

20 **MR. GRIFFON:** I guess the one -- again, I'm
21 going by memory, but the one operation, I
22 thought it was casting or furnace operations
23 where -- and from -- from what I recall
24 sometimes the slag would concentrate in the
25 plutonium or neptunium.

1 **MR. RICH:** Yeah, I mentioned that, you know, in
2 the --

3 **MR. GRIFFON:** And that's still covered within
4 this range, is it -- I guess that's my
5 question. If this range covers all those types
6 of operations I think --

7 **MR. RICH:** Yes. Yes -- Yes, I think so.

8 **MR. GRIFFON:** You know --

9 **MR. RICH:** And -- And by the way, you know,
10 when you -- when you reduce uranium it's
11 converted to UF tetrachloride and then reduced
12 with a magnesium bomb. And -- And there's a
13 certain amount of slag that comes up which has
14 impurities. It's -- Casting of uranium is a
15 purifying process in itself. But because of
16 the fact that they -- unique to Y-12 they
17 processed all of the ACU directly, immediately
18 and then -- then cast that to uranium directly
19 so that the slag was -- was less than what you
20 would normally get in some other process where
21 the material had sat around and was less pure.

22 **DR. MAKHIJANI:** Okay. So basically we're not
23 using the 62 ppb for anything?

24 **MR. RICH:** We really are not. And for -- And
25 for the reasons that I've explained.

1 **DR. MAKHIJANI:** Okay. I'm just trying to
2 understand what's happening.

3 **MR. RICH:** Sure. Sure.

4 **DR. MAKHIJANI:** And then sometimes we take the
5 4.5 ppb and apply that and sometimes we reduce
6 it by a factor of ten? No?

7 **MR. RICH:** That -- That -- That was -- That
8 was given as a -- a -- an option if you wanted
9 to get closer to the average. That's an
10 option.

11 **DR. MAKHIJANI:** That's -- That's in the sample
12 dose reconstruction.

13 **MR. GRIFFON:** Did they reduce it though?

14 **DR. MAKHIJANI:** I believe so. At least that
15 was Joyce's conclusion when she looked at the
16 number.

17 **MR. GRIFFON:** Okay. I need to look through --
18 We'll bring that up later when we look at that
19 example.

20 **DR. MAKHIJANI:** Okay. Why don't we -- I think
21 it's -- it's number seven or eight.

22 **DR. NETON:** I'm not clear why we would have
23 done that actually.

24 **DR. MAKHIJANI:** That's what she concluded. I
25 just got it this morning from her.

1 **DR. NETON:** That's fine. That's fine.

2 **MR. RICH:** The -- The -- The reduction -- we
3 -- we did list the -- the fact that the average
4 was a -- a certain factor below the maximum
5 that we used as the primary default.

6 **MR. GRIFFON:** Right.

7 **MR. RICH:** And -- And if you wanted to
8 reconstruct the dose on the basis of average
9 values why that was provided as a -- a guide.

10 **MR. GRIFFON:** And -- But there's no sort of
11 operational guidance to that is there? I mean
12 --

13 **MR. RICH:** Not -- Not -- Not in the TBD.

14 **MR. GRIFFON:** Not in the TBD?

15 **DR. NETON:** I think it's in the TBD. I'm
16 looking at the dose reconstruction and it must
17 have referenced why they did that if that's the
18 case.

19 **MR. GRIFFON:** But I mean how would the DR know
20 which --

21 **DR. NETON:** See, I'm looking at -- this may
22 have been a machinist -- a machinist operator
23 who's working with the already cleaned up
24 uranium maybe. See, and, you know, when the --
25 when they would come in there -- they'd have

1 the trained (inaudible) issue. Once they go
2 through this cleanup phase and recast it there
3 still may be something there and --

4 **MR. GRIFFON:** Yeah.

5 **DR. NETON:** -- and I'm just guessing at this
6 point but there may be some justification for
7 reducing that in a -- in a metals (inaudible)
8 effort but I -- I'm going to look through that.

9 **MR. GRIFFON:** It's still more of a DR question
10 anyway.

11 **DR. NETON:** It seems to me that, yeah, it did
12 not --

13 **MR. GRIFFON:** It's not an SEC issue, right.

14 **DR. NETON:** If the upper range is valid then
15 yeah.

16 **MR. RICH:** Another point of effect on that is
17 that Y-12 and the handling of highly enriched
18 uranium was unique to Y-12 and -- and resulted
19 in operations where a -- a good share of the --
20 the top of exposure could -- would occur. But
21 you will notice in looking at other processes
22 that a -- you know, it's -- the -- the value of
23 the material is so great that the -- the -- the
24 cleanup efforts were more effective and as a
25 consequence the concentrations of the recycled

1 uranium contaminants was less coming in on the
2 ACU than it was in other enrichment materials.

3 **MR. GRIFFON:** Which makes sense, yeah.

4 **MS. MUNN:** Yes.

5 **MR. GRIFFON:** It seems to make sense.

6 **MS. MUNN:** Yeah.

7 **MR. GRIFFON:** Anything else on this topic?

8 **MS. MUNN:** Don't think so but there is the
9 action item to potentially beef up this section
10 in the TBD.

11 **MR. GRIFFON:** Yeah, right.

12 **DR. NETON:** We're -- We're certainly going to
13 do that.

14 **MR. GRIFFON:** But probably not an SEC issue.

15 **MS. MUNN:** No, not --

16 **DR. NETON:** No, no, no.

17 **MR. GRIFFON:** That's right.

18 **MS. MUNN:** Not for us today.

ISSUE 4: POLONIUM-208

19 **ISSUE 5: EXOTIC RADIONUCLIDES**

20 **MR. GRIFFON:** Issue four is the polonium. I
21 think we got -- do you want to go through that
22 and then --

23 **DR. NETON:** Yeah.

24 **MR. GRIFFON:** -- we can break for lunch? I
25 think that'll be probably a good spot.

1 **DR. NETON:** I've kind of lumped these two
2 issues together in my mind.

3 **MR. GRIFFON:** The exotics and the polonium?

4 **DR. NETON:** Yeah, they're --

5 **MR. GRIFFON:** Yeah.

6 **DR. NETON:** -- cyclotron-related issues --

7 **MR. GRIFFON:** Yeah.

8 **DR. NETON:** -- although they are different.

9 **MR. GRIFFON:** Issues four and five. Even
10 better.

11 **DR. NETON:** All right. Well, I'll pass these
12 around.

13 **MR. GRIFFON:** Do you need more coffee, Jim?

14 **DR. NETON:** No. I got a good night's sleep
15 last night. I'll try the better night's sleep
16 first.

17 **MR. GRIFFON:** I'm going to try the coffee
18 first.

19 **DR. NETON:** Okay. What I -- What I handed out
20 here is sort of a -- a compendium of issues
21 related to cyclotrons so we can skip the first
22 section on external dose information until we
23 get to that issue. That's more relevant to the
24 exotic radionuclides. And then cut to the back
25 of this handout which includes some -- some

1 incident and -- and health physics reports from
2 the era of the polonium operations.
3 And let me just preface this -- these remarks
4 by saying that we last time at the Board
5 meeting and the working group and the
6 conference call that, you know, we were aware
7 of the incidents that were countable in this
8 Delta View database. In fact we got a -- a
9 very good sense that a number of hits on our
10 queries of the database that -- that spoke to
11 incidents, investigations, all that sort of --
12 sort of thing. And we were fairly confident
13 that we would come back here full of -- full of
14 incident reports to show and demonstrate that -
15 - that these things were followed up. Well,
16 the fact is that we queried the database; we
17 got -- depends on which query you use but the
18 most refined query we had which was incident
19 investigation in the SEC period showed up
20 somewhere (inaudible) to 80 titles that looked
21 to be of interest. And remember these are all
22 over there on this 400,000-plus page Delta View
23 database. We've pulled those reports, looked
24 at them, and in fact we can't at this point
25 provide any compendium of incidents for

1 internal dose investigations for cyclotrons or
2 for the polonium operations. That fact is a
3 big shock to us. It is what it is. I mean I
4 can't make up incident reports when they don't
5 exist. It also does not necessarily mean that
6 there were a large number of incidents that
7 went unrecorded but the fact is we just can't
8 put our hands around the issues at this time.
9 What I do have though is some -- some of the
10 health physics reports that we actually had in,
11 you know, at the last Board meeting --
12 available at the last Board meeting that talked
13 about follow-ups of issues. This first one on
14 a polonium-beryllium spill I think we can kind
15 of not ignore but we don't want to talk a lot
16 about it. Really it's just a intent to show
17 the flavor of -- of follow-up when there were
18 incidents. This was a polonium-beryllium
19 source which really has nothing to do with
20 polonium 28 but, you know, they did a detailed
21 follow-up with fecal sampling and -- and
22 exposures and tracked the guy out for months of
23 sampling and that sort of thing. I think I
24 turned my attention to the accelerator section
25 --

1 **MR. GRIFFON:** Jim, that first report, is it --
2 I'm sure it has a date somewhere in there.

3 **DR. NETON:** It's July -- It was a health
4 physics report between July through December
5 1951, yeah.

6 **MR. GRIFFON:** Oh, it's -- it's on the top.
7 Yeah.

8 **DR. NETON:** In that same time frame, in July
9 through December '51 we also have an
10 accelerator section that was written in a -- in
11 an HP report where they tended to be fairly
12 detailed about what was going on with the
13 cyclotron. There's a general section on -- on,
14 you know, the progress of where they are, how
15 they were making gallium at the time. More
16 significantly, when you get to page 39 you'll
17 see a section labeled exposure analysis. And
18 here they -- they -- they go to some great
19 length about exposure monitoring for cyclotron
20 operators and it's a pretty big deal. These --
21 They were very high dose exposures, that sort
22 of thing. At the very bottom you'll see a
23 thing called airborne contamination. Here they
24 summarize a report saying that there were 61
25 air samples obtained during this six-month

1 period at the cyclotron and they divided these
2 into four groups, and they provide these in --
3 in results in table 8 which I believe is on
4 page 41. Now, the airborne contaminate that
5 we're talking about here, the best I can
6 decipher from this is related to contamination
7 from polonium 208. That was the main isotope
8 of interest when they started the cyclotron in
9 1951. In fact they made a lot of, of the
10 stuff. The nature of the production of
11 polonium 208 was that it was not amenable to
12 being irradiated within a clad geometry.
13 Absorption of the protons in the cladage
14 (inaudible) so these -- the -- the (inaudible)
15 I think which was the target, was irradiated
16 there. That created a pretty large contaminant
17 problem. If you look at table 8 you'll see
18 that there -- as high as 15,000 DPM per cubic
19 meter of cyclotron during the operational area
20 -- in the operational area and down from there.
21 So again we have 60-something samples that were
22 taken in this -- in this period. We know what
23 the level of work. I mean we're not flamboyant
24 here. We knew that there were general airborne
25 contaminants of polonium. We have, of course,

1 no access to bioassay samples for polonium 208
2 that we could find. So at this point the
3 polonium reconstruction, we have this report.
4 And remember polonium reconstruction only
5 bracketed 1951 and part of '52. I think it was
6 September of '52 when it stopped.

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

8 **DR. NETON:** So the next report is on a similar
9 line, January to July of '52 you'll see on
10 table 7, airborne contamination during shut
11 down and then on page 24 of that report,
12 airborne contaminants are in the normal
13 operation levels. These levels are -- are much
14 lower but they're still very high compared to
15 the limit which they site here as 70 DPM per
16 cubic meter. Now, there are statements in here
17 that say we require everyone to wear
18 respiratory protection above 70 DPM per cubic
19 meter which begs the question then, well,
20 people were breathing up to 70 DPM per cubic
21 meter and then there's also the issue of -- of
22 the representativeness of the air samples and
23 that sort of thing. We're left in a bit of a -
24 - a pickle here right now with this polonium
25 issue. I -- I don't know where we're going

1 with this but certainly we weren't able to
2 produce what we -- we really firmly believed
3 that we had, you know, 70/80 of these incident
4 reports. In fact, I think ORAU went back and
5 did a wider search, opening the title search,
6 and pulled out 800 documents and looked through
7 all those. And -- And the well is dry. You
8 heard George speak earlier today that the data
9 may actually reside now at X-10 because this
10 was really an X-10 type operation. Now, you
11 know, I think though that the time is running
12 short and frankly maybe going to run out on us
13 on this issue. So I honestly am here to say I
14 don't know where we're at with this other than
15 we have air sampling data that we could use for
16 bracketing polonium. How robust that is and
17 how that allows us to reconstruct doses for the
18 workers right now is still a question mark in
19 my mind.

20 **MR. CHEW:** Jim, this is Mel.

21 **DR. NETON:** Yeah.

22 **MR. CHEW:** I think I faxed you, too, this
23 morning -- remember, we went out to the ORNL
24 library to look for X-10 information to see if
25 we could find inference to either incidences or

1 the way they operate. And I think I sent you a
2 -- or faxed to you this morning -- we looked at
3 the progress report, April 1, 1951 to June
4 30th, 1951 is the cover page. And the second
5 page it says 86-inch cyclotron. And
6 considerable attention has been given to both
7 personal protection from alpha activity
8 associated with cyclotron components.

9 **DR. NETON:** Right.

10 **MR. CHEW:** Okay.

11 **DR. NETON:** Yeah, I -- I've looked through
12 that, Mel, and -- and I think that there --
13 there is a pretty good picture here that --
14 that the health physics program paid a lot of
15 attention to this activity. I mean there are --
16 -- there are air samples like I just talked
17 about. There are recommendations for hand and
18 foot monitors. There are protective equipment,
19 clothing recommendations. And there is
20 certainly indications of use of respiratory
21 protection.

22 **MR. CHEW:** But I -- I want to --

23 **DR. NETON:** I put this in a situation though
24 where we have monitoring data. We have -- We
25 have indications that there was a -- a

1 reasonable health physics program but
2 everywhere I look in here there are indications
3 that -- that say that they are maybe below the
4 maximum permissible levels. You know, they put
5 respirators on when they reach 70 DPM. Yet we
6 have acknowledgement then in their own reports
7 that there were exposures. Yet we have no
8 confirmatory bioassay data to -- to rely on to
9 validate that that actually happened. And so
10 I'm in a little bit of a quandary myself right
11 now as to how -- how robust those data are in
12 order to cover polonium exposure for cyclotron
13 workers. That's where we are so I wish -- I
14 wish we had more to offer. We certainly firmly
15 believed we had -- had the data covered.

16 **DR. MAURO:** What kind of doses are you talking
17 about at 70 DPM?

18 **DR. NETON:** Well, if -- if one -- and I haven't
19 run this to ground but if 70 DPM were the --
20 were the back or the MAC or whatever you want
21 to call it in that period, you potentially, you
22 know, at the -- in that time frame 15 rem to a
23 critical organ maybe?

24 **MR. RICH:** It was -- It was set up for
25 uranium.

1 **MR. GRIFFON:** Do you think that was a week
2 though? I mean I don't know if they'd be doing
3 that for --

4 **MR. RICH:** -- for the uranium.

5 **DR. NETON:** What's that?

6 **MR. RICH:** The 70 DPM was set up for uranium.

7 **DR. NETON:** Right. So that was not clear to me
8 why they were using 70 DPM alpha in the
9 polonium 208 facility. That -- That doesn't
10 jive.

11 **MR. RICH:** Well, that's a relatively short-
12 lived isotope.

13 **DR. MAURO:** Yeah, that's what I was going to --

14 **DR. NETON:** Well, it's two years. It's not
15 that short. So you're going to get your 50-
16 year dose within six years or so maybe but we
17 could run that calculation and show what --
18 what workers were exposed to, if they received
19 the maximum allowable exposure at 70 DPM. Is
20 that plausibly bounding? I -- I'm not sure.
21 Let me look through that and say well, is this
22 -- what do we do with that?

23 **DR. MAURO:** Is there an endangerment issue
24 here? I mean that's what --

25 **DR. NETON:** Well, yeah.

1 **MR. GRIFFON:** Yeah.

2 **DR. MAURO:** I just wanted to make sure I
3 understood that.

4 **DR. NETON:** Yeah, I -- I think with 70 DPM if -
5 - if, you know, it's -- it's an alpha activity
6 so let's assume it's similar to uranium in
7 terms of its dose premiere intake. I think
8 it's lower but it's in that ballpark. You're
9 going to get into the range of doses that would
10 endanger health. Okay. No doubt in my mind.
11 Now, there's a whole additional piece. The
12 cyclotron only operated for polonium for a year
13 and a half period

14 **MS. MUNN:** Sure.

15 **DR. NETON:** But there may have been some
16 residual contamination issues here. I mean it
17 was clear they couldn't get rid of the problem.
18 Once they -- once the polonium kind of
19 distributed itself in the process it was kind
20 of hard. You'll -- You'll see the locker
21 rooms had contamination at this point so -- but
22 yeah. I really wish we had some polonium
23 bioassay samples, which I thought we had but we
24 don't, to bracket. Again, the health records
25 program seemed to have done everything they

1 could to limit exposure below the maximum
2 allowable dose. But again it's been our
3 practice in the past not to use that as a -- a
4 logic path to say that that's what the maximum
5 are. We've just not been comfortable doing
6 that. So again I'll leave the issue open at
7 this point but I guess that's as much
8 information as I can present to you at this
9 time.

10 **MS. MUNN:** Jim, there -- this report -- you had
11 to turn in this report.

12 **DR. NETON:** Uh-huh.

13 **MS. MUNN:** It indicated that there were 63
14 names identified in 1951 as being associated
15 with this.

16 **DR. NETON:** Right.

17 **MS. MUNN:** Is this pretty close to the -- to
18 the worker population we're looking at --

19 **DR. NETON:** I think --

20 **MS. MUNN:** -- in the '60 to '70?

21 **DR. NETON:** I think it's our opinion that
22 that's in that ballpark.

23 **MR. GRIFFON:** It's fairly close.

24 **MS. MUNN:** Just about covers it?

25 **DR. NETON:** Yeah. We -- We had heard --

1 **MS. MUNN:** And we have well less than 100
2 people.

3 **MR. KERR:** There were some people coming and
4 going here as far as --

5 **MS. MUNN:** Oh, yes. Yeah.

6 **MR. KERR:** -- depending on what was being done.

7 **MS. MUNN:** Right.

8 **DR. NETON:** But it's our understanding from
9 interviewing people who were involved with the
10 process and others that cyclotron operation was
11 a relatively small process operation relative
12 to Y-12. Many of the people were actually X-10
13 workers --

14 **MS. MUNN:** Right.

15 **DR. NETON:** -- not Y-12 workers and, you know,
16 (inaudible) of physicists, technicians with
17 some supplemental maintenance staff --

18 **MS. MUNN:** Right.

19 **DR. NETON:** -- that worked there. Certainly
20 it's our opinion it's less than 100 workers.

21 **MS. MUNN:** And the whole thing lasted less than
22 a year and a half?

23 **DR. NETON:** Well, for polonium.

24 **MS. MUNN:** For polonium, yes.

25 **DR. NETON:** The cyclotron --

1 **MS. MUNN:** Yes, the cyclotron.

2 **DR. NETON:** But the number is a relative,
3 numbers of people working cyclotron I think
4 stayed about in that ballpark.

5 **MS. MUNN:** Okay.

6 **MR. KERR:** Some of the, those studies done
7 after -- immediately after this (inaudible)
8 where radiation (inaudible). It was
9 (inaudible). So it wasn't really radiated
10 conferences.

11 **MS. MUNN:** These workers should be fairly easy
12 to identify, shouldn't they?

13 **MR. KERR:** We have to. That's what I said.
14 We've got -- we have obtained at least three or
15 four memos that have the names of people --

16 **MS. MUNN:** You know just exactly --

17 **MR. KERR:** And we know --

18 **MS. MUNN:** Yeah.

19 **MR. KERR:** -- and has badge numbers.

20 **MS. MUNN:** Yeah.

21 **MR. GRIFFON:** A complete listing or as best you
22 know?

23 **DR. NETON:** Be careful. As best we know. We
24 know --

25 **MR. GRIFFON:** As best you know, right.

1 **DR. NETON:** We have written memos but --

2 **MR. GRIFFON:** We know it's a small group, a
3 relatively small group.

4 **DR. NETON:** The cyclotron facility. We have
5 that list. We have worker lists.

6 **MR. KERR:** We have some of the lists of people
7 who have been monitored.

8 **MR. GRIFFON:** You know, I don't -- you probably
9 haven't done this yet but do you know if all
10 these people are in a similar department or --
11 or is there any consistency there? Probably
12 not because --

13 **MR. KERR:** Not now.

14 **MR. GRIFFON:** -- groups and other, yeah.

15 **MR. KERR:** We have people that have keys to
16 their (inaudible) and those you can -- I've
17 looked at departments that they're out of. And
18 they're mainly out of I think the department
19 number for molecular nuclear --

20 **MS. MUNN:** Yes.

21 **MR. GRIFFON:** I counted up here some of the --

22 **MR. KERR:** And the other one was electrical
23 maintenance had some people with keys and a
24 research support group has several -- a number
25 of people with keys. So those --

1 **MR. GRIFFON:** That's about it, yeah.

2 **MR. KERR:** -- about three departments.

3 **MR. GRIFFON:** I'm just thinking of other ways
4 if you didn't -- I'm not sure your list is
5 complete. Maybe you could know with
6 departments, you know. I mean but --

7 **DR. NETON:** But nonetheless, I'm still not
8 clear how we're going to put a bound on this.

9 **DR. MAURO:** That's what I was going to ask now.
10 What I'm hearing is if you do go down the road
11 and try to place a plausible up or down, what
12 I'm hearing is you have fair measurement data
13 to have quite a large distribution. So the
14 handle you might have -- the only real handle
15 you have is to somehow use that data -- and I
16 don't know if this is (inaudible) own data or
17 (inaudible) data but somehow come up with a
18 number that you're going to say this is a
19 plausible up or down and apply it to all of
20 these workers. Is that -- one -- one thing
21 that's --

22 **DR. NETON:** That -- That -- That would be at
23 this point given the data that we have, that
24 would be an option.

25 **DR. WADE:** And the other option would be to --

1 **DR. NETON:** Revise the SEC evaluation and add
2 this cyclotron worker class.

3 **DR. WADE:** And so as we pursue this option it
4 would be good to have discussions obviously
5 with DOL as I'm sure the Board will have
6 questions for DOL related to that at the next
7 meeting.

8 **DR. NETON:** I think you know --

9 **MR. GRIFFON:** How about the other nuclides? I
10 mean you --

11 **DR. NETON:** Yeah.

12 **MR. GRIFFON:** This is polonium, right?

13 **DR. NETON:** The story -- The story gets a
14 little murkier --

15 **MR. GRIFFON:** Right.

16 **DR. NETON:** And that's where I -- I --

17 **DR. MAKHIJANI:** That would be the easy part.

18 **DR. NETON:** True. At least we have some air
19 monitoring data for the -- Now, you have these
20 other exotics, so-called exotic radionuclides
21 that Mel Chew and his team did a great job
22 putting together the table. We know when they
23 were produced now, you know, under what time
24 frames and what they weren't. Or it pretty
25 much covers almost the periodic table as to

1 what was produced. We found no -- we would
2 hope that these incident reports would have
3 fleshed those out as well. And there's nothing
4 there. So now we don't know how to bracket
5 those potential incidents that may have
6 occurred. It seems unreasonable to me to
7 believe that none occurred and that's why we
8 don't have any incident reports. I just -- I
9 just have trouble believing that because in the
10 1960s we have some reports that we actually
11 showed. That gallium is a good example of
12 that. And we said, geez, this -- it was
13 actually one MAC into the -- into the
14 (inaudible). So they're out there somewhere.
15 They may be at X-10. We don't know. I also
16 mentioned early on that the external data for
17 the cyclotrons are not all necessarily in the
18 CER database. Some maybe but not all. Given
19 that then we're in the position of -- of having
20 to say that let's go to the Delta View
21 database. Sound familiar? You know, we can --
22 we can pull these data out. They may be there.
23 They may be at X-10. So we have no way to
24 reconstruct right now internal exposures from
25 which I believe were fairly low doses, but we

1 have no way of proving that. And secondly the
2 external exposures at this point are not
3 covered by any of our existing co-worker
4 models. So the cyclotron worker issue really
5 looks to me to be fairly, you know, -- I don't
6 know what word to use on that. We don't have a
7 lot of data.

8 **DR. WADE:** Fairly clear.

9 **DR. NETON:** Not very clear.

10 **DR. WADE:** Well, it is clear. I mean our
11 actions will be clear. That's what we're --
12 that's what we're here to do. So look at the
13 reality and make decisions.

14 **DR. NETON:** We have to make decisions. I'm not
15 saying that we've -- we've made that decision
16 at this point but you -- given the -- given the
17 weight of the evidence that we presented here
18 it's going to be hard for us to come up with a
19 bound -- a plausible bounding analysis.

20 **MR. GRIFFON:** And I think part of that
21 consideration might be the small number of --

22 **DR. NETON:** It's a small number of workers on
23 top of that so then how much effort do we
24 expect. I believe the reports are there
25 somewhere.

1 **MR. GRIFFON:** Right.

2 **DR. NETON:** But do we spend a massive amount of
3 man-hours to pull these records out to prove
4 that those doses were small?

5 **MS. MUNN:** Has there been an effort to?

6 **MR. GRIFFON:** Because out of those --

7 **DR. NETON:** Yes, Mel mentioned that they were
8 yesterday looking for incident reports in the
9 library for X-10. We found the investigations.
10 They -- They typically, the ones we've looked
11 at, the ones that I've seen, two or three, are
12 related to external exposure where someone
13 walked into the area --

14 **MR. GRIFFON:** Unlocked.

15 **DR. NETON:** -- unlocked and they received an
16 exposure. They did nice to follow up. I would
17 have expected to see a similar level of
18 attention paid to internal. Now, it may be
19 because as we'll talk about later in that case
20 study that John threw over our side, you know,
21 the mindset in this time period was not so much
22 let me figure out what a person's internal dose
23 is but are we concerned at all that workers are
24 above the maximum permissible amount at that
25 time. Very much like TLV for industrial

1 hygiene. As long as we know workers are below
2 X they weren't really concerned with
3 calculating a detailed internal dose. That
4 just wasn't the way business was done back
5 then. And -- And this may be what we're up
6 against. Everyone recognized that these are
7 short liberated nuclides. Yeah, you blow a
8 little bit into the air but it goes away so we
9 don't have a good way to hang our -- well, it's
10 anything to hang our hat on right now. So I
11 cut that pretty short but that's --

12 **MR. GRIFFON:** You did.

13 **MS. MUNN:** There's nothing to argue about.

14 **MR. GRIFFON:** I was just going to ask -- I know
15 what I was going to ask. A lot of the
16 claimants -- I don't know if you have a way to
17 figure this out but how many were potential
18 cyclotron workers?

19 **MR. KERR:** I think we've been looking back at
20 that.

21 **MR. GRIFFON:** Have you looked at that?

22 **MR. KERR:** There's two at Y-12.

23 **MR. GRIFFON:** Right. So we're talking --

24 **MR. KERR:** And I briefly looked through the
25 (inaudible) and I wasn't able to identify

1 anybody, you know.

2 **MR. GRIFFON:** So we're talking 65 to 100 in the
3 whole population and two in the claimants?

4 **DR. NETON:** Well, maybe in the claimant
5 population.

6 **MR. GRIFFON:** Maybe a few more in X-10, yeah.

7 **MR. KERR:** I looked at X-10 and I -- just a
8 quick look --

9 **MR. GRIFFON:** Right.

10 **DR. NETON:** I think there's a third which is
11 the gallium incident one that we found in the
12 '60s that led us down this path --

13 **MR. GRIFFON:** Right.

14 **DR. NETON:** -- thinking, oh, my gosh, look at
15 the wealth of --

16 **MR. GRIFFON:** It is significant, yeah.

17 **DR. NETON:** We went into a detailed
18 investigation of this gallium and we thought,
19 well, this is great. Everybody must have some
20 similar level of documentation and it's turned
21 out to be --

22 **DR. WADE:** Are there cyclotron operators
23 outside the period covered by this SEC?

24 **DR. NETON:** Yes.

25 **MR. GRIFFON:** Yes.

1 **DR. WADE:** So it's -- could re-- depending upon
2 our judgment it could result in an identified
3 class.

4 **MR. GRIFFON:** Expanded year class.

5 **DR. NETON:** Yeah, it would be expanded year I
6 think.

7 **DR. WADE:** Or by us as -- as another class.

8 **MS. MUNN:** Oh, yeah.

9 **MR. KERR:** In 19-- 1960 -- 1960 and 1961 an
10 operation of the cyclotron went entirely X-10.

11 **MR. GRIFFON:** Yeah.

12 **MR. KERR:** But it was used for us.

13 **DR. NETON:** You've got to be careful though.
14 Under the change of geographic location, the
15 way we're doing business right now is --

16 **MR. GRIFFON:** Yeah, yeah.

17 **DR. NETON:** -- is an X-10 -- it's a Y-12
18 operation.

19 **DR. WADE:** It opens up various issues
20 inappropriate for us to look at. It's really
21 what is supposed to come from this process.
22 It's a good thing.

23 **DR. NETON:** I think for purposes of this SEC
24 for instance if we were to make a supplement to
25 add cyclotron, I think we -- we would cut it at

1 '57 with the understanding that we would have
2 an ongoing investigation into an additional --
3 I just don't want to delay --

4 **MR. GRIFFON:** Right.

5 **MS. MUNN:** Yeah.

6 **DR. NETON:** -- for the effort.

7 **MS. MUNN:** Yeah.

8 **DR. WADE:** Because if you were to find
9 claimants who would fall outside of that time
10 frame --

11 **MS. MUNN:** Right.

12 **DR. WADE:** -- then we could work with those
13 claimants.

14 **DR. NETON:** We could work with them through the
15 process or whatever.

16 **MR. KERR:** System workers --

17 **MR. GRIFFON:** Did --

18 **MR. KERR:** I guess what -- maybe after this '57
19 period we ought to walk through the monitoring
20 data on the people who were working at the
21 cyclotron when we go back in the early '50s
22 which may make a difference.

23 **DR. NETON:** Example we had for gallium.

24 **MR. GRIFFON:** Right. So we could leave that
25 open.

1 **MR. KERR:** Right.

2 **DR. NETON:** Because after '58, you know, the
3 recommendations to work were incorporated and
4 they were a little better about internal
5 monitoring although I don't make any -- I don't
6 make any predictions any more about what was
7 done.

8 **MR. GRIFFON:** That's where we are, like you
9 said, yeah. I think we're at -- that's the
10 issue four and five actually. I don't think
11 there's anything else to add on that.

12 **DR. NETON:** No.

13 **MR. GRIFFON:** The only thing, I was looking
14 back at my questions coming into today and
15 everything's been answered except for the
16 question, and it's from an earlier issue we
17 discussed but some of these memos -- all these
18 memos that you've emailed, some of the memos
19 have been cited by Mel and others. And can you
20 just make sure they're on the O-drive or
21 whatever in that directory so we can look at
22 them?

23 **DR. NETON:** Sure.

24 **MR. GRIFFON:** And also the -- the -- I think
25 you used some of this data from these -- these

1 reports. I emailed you on this. These reports
2 that were under classification review, the
3 health and safety reports. Are they available
4 yet or not yet?

5 **DR. NETON:** No.

6 **MR. GRIFFON:** I think you said they were still
7 under -- under review or whatever. So if they
8 become available you'll post them, okay.

9 **DR. NETON:** As soon as we get them we'll put
10 them out.

11 **MR. GRIFFON:** Okay. I think we're at a -- I
12 think we need a break.

13 **DR. WADE:** To the people on the phone, so we'll
14 break and we assume we'll come back at 2:00
15 p.m.?

16 **MR. GRIFFON:** 2:00 p.m., yeah.

17 **DR. WADE:** We're going to break contact with
18 the call now.

19 **MR. CHEW:** All right.

20 (Whereupon, a recess was held from 12:55 to
21 2:10 p.m.)

ISSUE 6: 1948 AND 1949 SALVAGE AND RECYCLING

22 **WORKER INTERNAL DOSE**

23 **MR. GRIFFON:** Jim, we're on the record now. I
24 guess we're going to pick up with issue six.

25 **DR. NETON:** Issue six.

1 **MR. GRIFFON:** '48 to '49 salvage and recycle
2 worker internal dose.

3 **DR. NETON:** I don't have a real handout for
4 this so I can just talk through it but it's a
5 fairly straightforward issue in my mind. The
6 issue is that we -- as people -- you recall we
7 have no bioassay data for '48 and '49 for
8 workers at Y-12, at least none that we have
9 access to. I think there is some but we just
10 don't have it. So it turns out we took workers
11 with bioassay in 1952 and -- and used them to
12 recon-- to -- to predict what the maximum
13 intake could have been in '48 and '49 given
14 what the excretion rates were in 1952. And we
15 came up with what we believed to be some fairly
16 generous estimates. And I think in general
17 there was agreement --

18 **MR. GRIFFON:** Yes.

19 **DR. NETON:** -- among the working group that
20 that seemed to be a reasonable approach with
21 the proviso that we had to demonstrate somehow
22 that, you know, we're the subset of workers who
23 were called the salvage workers in 1948 and '49
24 also present in 1952. And as importantly was
25 their distribution similar to the overall

1 distribution of workers in 1952 or were there -
2 - is there some subset that we should account
3 for and -- and increase their dose? That's the
4 story. Now, the result was that we found there
5 were 352 workers who we had monitored data for
6 in 1952.

7 **MR. GRIFFON:** I think you did send something on
8 this issue.

9 **DR. MAURO:** There was something.

10 **DR. NETON:** Okay. I did. That was the -- in
11 fact I can pass this out.

12 **MR. GRIFFON:** Right.

13 **DR. NETON:** This has actually --

14 **MR. GRIFFON:** Yeah, that's it.

15 **DR. NETON:** -- a hodge-podge of -- of
16 information. And what's relevant is item
17 number one here on the chart that talks about
18 393 ID's with urinalysis data in 1952. We
19 check the job categories or titles of those
20 people and nine have salvage related job
21 titles. Okay. We also went back and looked at
22 workers -- the job titles of workers who were
23 there in -- prior to 1950 and it turns out that
24 there were nine people with job titles of
25 salvage workers before 1950. So we have gone

1 back and actually looked at the distribution of
2 the nine people who have salvage job titles at
3 Y-12. And of the people who were listed as
4 salvage workers the minimum bioassay was zero,
5 the average was 24, and the maximum was 576.
6 And these are in DPM for 24 hours. If you look
7 at the total population of 393 workers the min
8 was -1, the average was 33, and the max was
9 38,000.

10 **DR. MAKHIJANI:** Where are you reading from?
11 Sorry.

12 **DR. NETON:** I'm reading from my own private
13 piece of paper here. I'm sorry. I didn't mean
14 to be facetious. I -- I'm sort of elaborating
15 on that -- that first sentence on the sheet
16 that was just handed out that said internal
17 bioassay review. It talks about the 393 ID's.

18 **MR. GRIFFON:** Oh, yeah. Right.

19 **DR. NETON:** We went back and looked at the --
20 at the bioassay records for those nine salvage
21 workers and I was just comparing the
22 distribution -- a rough comparison of
23 distribution. And it turns out that the
24 average value for the overall population is a
25 little higher than the average value for the

1 nine salvage workers. They're in -- it's in
2 that ballpark. There doesn't seem to be any
3 issue with -- with them being way out of whack
4 which -- which is kind of consistent with what
5 we were thinking is these people were pulling
6 residual contamination of uranium off the
7 pieces and parts. I guess one could --

8 **MR. GRIFFON:** Jim, is this -- is this salvage
9 related job titles, what -- is there any --
10 there was a salvage department I saw in some of
11 the health physics reports.

12 **DR. NETON:** I actually think that they had
13 salvage worker in their job title.

14 **MR. GRIFFON:** It did say salvage worker, yeah.

15 **DR. NETON:** Yeah, that's what Bill -- Bill
16 Tankersley was clear on that --

17 **MR. GRIFFON:** Yeah.

18 **DR. NETON:** -- that they did have a salvage
19 worker title.

20 **MR. GRIFFON:** Okay.

21 **DR. NETON:** So now, the other comparison was I
22 think that there were -- of the people who were
23 monitored, 393 who were monitored in '52, I
24 believe, and someone help me out, is about 140
25 -- 40 percent of workers also had -- were also

1 working in the pre-'50 period. We don't think
2 that's necessarily an issue of attrition so
3 much as of maybe adding new workers but
4 nonetheless, there was a very good overlap of
5 workers in '52 with the pre-'50. And in fact
6 the nine salvage workers seem to match up
7 between those two periods. So we don't have
8 what seem -- there doesn't seem to be an issue
9 here for us anyways that -- that what we've
10 done is -- is a fairly reasonable approximation
11 or if anything a claimant favorable
12 approximation of their exposures. We do --
13 went back and tried to identify any air sample
14 data that may be useful in helping to also
15 corroborate this and couldn't find it. That we
16 did not find. It didn't pan out for us.

17 **MR. GRIFFON:** Jim, I think that's reassuring.
18 I don't know if --

19 **DR. MAKHIJANI:** Give us the data and we'll be
20 able to see the, write the worker numbers down.

21 **MR. GRIFFON:** That's -- That's -- That's what
22 we asked for and, you know, it looks like
23 you've done it so --

24 **DR. NETON:** We -- We -- The good news is we
25 were able to track it. We've identified it and

1 we'll get you the data.

2 DR. MAKHIJANI: Good.

3 DR. NETON: Okay.

ISSUE 7: Y-12 WORKER DATA INTEGRITY ISSUE

REGARDING INTAKE INCIDENT

4 MR. GRIFFON: And I guess we're on to issue
5 seven.

6 DR. NETON: Issue seven. That is the case
7 study; is that right?

8 MR. GRIFFON: Right.

9 DR. NETON: Yeah, I -- I -- I looked at that
10 case in the last conference call. I hadn't had
11 a chance to -- to review the case. And I sent
12 around an email --

13 MR. GRIFFON: Yeah.

14 DR. NETON: -- I thought that was about a page
15 response to the -- what I thought the issues
16 were and I'm still on that -- on that bent
17 that, you know, the spectra theory looked like
18 there was in the K-40 there. And my knowledge
19 of that system was that they were using a -- a
20 complex technique that I wonder -- wonder why
21 they do that but they did it nonetheless. And
22 certainly it's plausible that that 30 millirem
23 contributing to the content continuing in the
24 185 region. My guess is there's about ten
25

1 (inaudible). I'm looking at the K-40 versus
2 the --

3 **DR. BEHLING:** That's where I came out after I
4 realized that I had missed the --

5 **DR. NETON:** Yeah.

6 **DR. BEHLING:** I mean I looked at that and I
7 said, why are they squeezing all of that 1.5 in
8 the -- into 500 channels? I expected that to
9 be --

10 **DR. NETON:** Yeah.

11 **DR. BEHLING:** -- 4,096 channel -- multi-channel
12 analyzer and I looked at those two peaks and I
13 jumped to a conclusion that it wasn't -- the
14 data wasn't there for me to say no to it. It
15 was only after you explained it that I
16 realized. And the striking fact is that the 93
17 and 186 are a factor of two apart.

18 **MR. GRIFFON:** Oh, yeah.

19 **DR. BEHLING:** And the 66 and the 1 -- 4.6
20 happen to be exactly --

21 **DR. NETON:** I can sort of see how you came to
22 that conclusion but I --

23 **MR. GRIFFON:** The energy is written over those
24 peaks but I realize --

25 **DR. BEHLING:** Well, now, I wrote that in there

1 and there was --

2 **DR. NETON:** (Inaudible) original (inaudible)
3 and I said there's more energies here.

4 **MR. GRIFFON:** Yeah. Yeah.

5 **DR. BEHLING:** It was intended to be an internal
6 memo --

7 **MR. GRIFFON:** Right.

8 **DR. BEHLING:** -- which I had sent to John.

9 **MR. GRIFFON:** That's fine.

10 **DR. BEHLING:** And I had said for -- for
11 explanatory reason I'll make the assumption.
12 And it was an assumption that I had no qualms
13 with because there was nothing there that says
14 it's 2.9 KV per channel. It could have easily
15 been .4, in which case the two peaks would have
16 corresponded.

17 **DR. NETON:** I think that counter was used for
18 multiple purposes and one was to do thorium
19 measurements. And I think if 228's got a peak
20 of 911 KPU that they would have used to
21 quantify thorium exposures and -- and other
22 issues. But you're right. I mean I -- I don't
23 -- it doesn't make a lot of technical sense to
24 measure something. I'm pretty sure this was 11
25 by 4 inch detector. That's a pretty big --

1 **DR. BEHLING:** That's a huge volume detector --

2 **DR. NETON:** Yeah.

3 **DR. BEHLING:** -- that is not usually used for
4 lower energy protons.

5 **DR. NETON:** And that was actually what was in
6 the mobile counter which this may be the count
7 from was two of those detectors. The person
8 was sandwiched between two of those detectors.
9 Nonetheless, you know, they did try to account
10 for that count being scattered but the problem
11 is variable mass people, someone like myself
12 versus a skinny person, the peak would change
13 even in that. And so the ability to predict
14 how many cesium counts were in that 185 region
15 is pretty poor.

16 **MR. GRIFFON:** Yeah.

17 **DR. NETON:** And even worse in the 6393. One
18 thing that should have tipped you off maybe was
19 that the 93 should have had a (inaudible) of 63
20 because that's equally a (inaudible) that has
21 the 93 before --

22 **MR. GRIFFON:** Yes.

23 **DR. NETON:** -- the 234.

24 **MR. GRIFFON:** Yeah.

25 **DR. NETON:** Anyway, so -- so I think that issue

1 kind of goes away with the exception that,
2 okay, how good is mobile counter and -- and
3 what does that really mean in terms of the
4 overall program ability to measure dose. Oh,
5 let me follow up.

6 **MR. GRIFFON:** Yeah.

7 **DR. NETON:** They did follow up as I said, with
8 a urine sample which the practice --

9 **MR. GRIFFON:** Right.

10 **DR. NETON:** -- to say, okay, I see an evidence
11 of a positive uranium intake. Let me take a
12 urine sample. It showed up I think it was --

13 **DR. BEHLING:** 69?

14 **DR. NETON:** -- 63 or 96 DPM which was below
15 their stated action level at that point of 90
16 DPM per year. That 90 DPM, even as late as 19-
17 - I had to think about this for a little bit
18 but even as late as May 1989 DOE workers were
19 still being monitored under the old ICRP-2
20 requirements. So you can calculate Q, the
21 maximum body burden that could be in the lungs,
22 but 365 a year and not exceed 15 rem per
23 quarter. For a lung counter they're only
24 focusing on insoluble uranium. So that came
25 out to be somewhere around 17 microcuries I

1 think, worked up in micrograms. And so they
2 exceeded what they thought was over 15 rem
3 potential exposure to lung if that were there
4 all year. They took a urine sample and you
5 could also calculate under the old ICRP-2
6 concept what would be in the urine if I had 117
7 microcuries using that old sample one model of
8 a 120-day half-life in the lung. That comes
9 out to around 90 DPM. So as long as I'm
10 excreting less than 90 DPM per liter I don't
11 have the potential to exceed the --

12 **DR. BEHLING:** Exceed 15.

13 **DR. NETON:** So -- So they took a sample. It
14 was less than the 90. They go out. I got this
15 issue going here. It's less than 90, it's good
16 to go. And -- And it wasn't their practice in
17 those days to record any dose at all for
18 workers who were just were below the --

19 **DR. BEHLING:** You know, it seems so strange
20 when I compare it to Rocky and then, you know,
21 Rocky Flats, when you look at their TBD they
22 introduced detectors. Subsequently they used
23 high purity uranium -- detectors and they used
24 urinalysis that would have an MDA value of less
25 than one DPM in a 24-hour urine sample. And of

1 course, when you look at the MDA associated
2 with Y-12, under optimum conditions 26 DPM in a
3 24-hour period. And that's optimum; more than
4 likely twice that realizing that you're
5 potentially going to be looking at higher
6 background in a -- in a proportional
7 (inaudible). So I'm looking at that and sort
8 of saying why did they risk, at that late date,
9 up until September of 1989, they used gross
10 alpha and urinalysis data that was so far out
11 of whack with what the rest of the industry was
12 doing.

13 **DR. NETON:** I totally agree with you. I mean
14 that -- that's something that I -- I actually
15 went out -- went back and pulled their -- their
16 procedures back in that era and they were using
17 gross alpha with proportion in there. And if -
18 - it was electrode deposition which attributed
19 --

20 **DR. BEHLING:** That's 20 volumes.

21 **DR. NETON:** -- that appeared to be right out of
22 the urine sample after it may have been
23 digested slightly. So it -- it was a very high
24 level. I guess one -- one could speculate
25 that, you know, it met -- it met the need at

1 the time, you know. You want workers in
2 plutonium. Plutonium had a -- a more stringent
3 controls on it.

4 **MR. GRIFFON:** I'm sure that was the rationale,
5 right? I mean --

6 **DR. NETON:** Why -- Why -- Why spend, you
7 know, I can see management saying why spend
8 \$300 a sample when you can process it within --
9 within the regulations for 50. I mean I don't
10 know if that's true but that -- that certainly
11 could be why. So, you know, that's -- that's
12 the bottom line I think on that issue. I don't
13 really see that there's -- I think the mistake
14 that was made was to try to attribute the
15 cesium P.

16 **DR. BEHLING:** No, I completely -- completely
17 misread that spectrum.

18 **DR. NETON:** I've seen better --

19 **MR. GRIFFON:** That's interesting because that
20 caught my eye because I've heard people down
21 there in interviews say the same thing, that I
22 -- I came out high on my count and they just
23 said -- they said, oh, do I hunt deer, you
24 know, and they -- so this isn't the first time
25 that's -- that's come up. I never saw it in

1 writing like this but --

2 **DR. NETON:** At Savannah River it's even worse.
3 I mean the -- the clay soil in that region for
4 some reason binds --

5 **DR. BEHLING:** Binds cesium.

6 **DR. NETON:** -- binds cesium. So then the deer
7 graze on the vegetation and even fallout from
8 years and years and years ago are still
9 available for uptake in the plants. There
10 doesn't seem to be a kind of source for cesium
11 for this worker and that doesn't seem to be the
12 issue --

13 **MR. GRIFFON:** Right. Right.

14 **DR. NETON:** And I guess at the end the bottom
15 line is that the DOE provided us every number
16 that -- that we used to try to validate whether
17 they did it right so in that sense we were --
18 we were focusing on the integrity of the data.

19 **MR. GRIFFON:** Yeah.

20 **DR. NETON:** I would say that the data were not
21 sensitive.

22 **MR. GRIFFON:** Yeah.

23 **DR. NETON:** We could argue about the
24 interpretation that they made but they provided
25 us all the values in order to make that

1 interpretation.

2 **MR. GRIFFON:** And I guess the other add-on is
3 you're not relying on that data to do dose
4 reconstructions anyway. You're using end data,
5 right?

6 **DR. NETON:** Yeah, lower -- the 69 DPM certainly
7 comes into play.

8 **MR. GRIFFON:** Yeah, right. It does come into
9 play.

10 **DR. NETON:** And I think this was a TIB 2
11 approach originally that the -- the case -- I
12 don't want to get too much into detail --

13 **MR. GRIFFON:** Yes.

14 **DR. NETON:** -- but I think the case was non-
15 compensable first pass.

16 **DR. BEHLING:** I think he has the second cancer
17 which will now be valued under the revised
18 lymphoma DCF.

19 **DR. NETON:** Exactly. So the second cancer
20 which -- what would be a different dose
21 reconstruction but I believe that the urine
22 sample was bounded by the two two over-estimate
23 approach in the first pass.

24 **DR. BEHLING:** Uh-huh.

25 **DR. NETON:** But yeah. That was what I was

1 trying to say in my last sentence of my write-
2 up that we need to look at this through the
3 lens of modern interpretation and dose models
4 which I think we're doing.

5 **DR. BEHLING:** I did look at the historical
6 other -- I checked on data and get an
7 understanding of just the insensitivity of that
8 because if you look back, and I brought a few
9 photocopies with me that are, you know, crossed
10 out, blackened out the name I can distribute,
11 but they had in one instance a historical
12 whole-body count or chest count -- they really
13 didn't distinguish between them -- where the
14 uranium 235 was recorded as -99 micrograms
15 negative meaning that between plus and minus
16 100 there was really no way of determining
17 whether or not you had anything in you.

18 **DR. NETON:** Well, the problem depends on where
19 that -- I'm very familiar with the Y-12 mobile
20 -- mobile counter. It was used for (inaudible)
21 but I had -- I had on my desk data, this being
22 for all the workers and for all that had been
23 measured with that counter and it's very, very
24 subject to radon fluctuations in air. You can
25 imagine you're doing this count, and you do it

1 in the -- in the afternoon hours your
2 background when there's a conversion --
3 or whatever and the next thing you know it's
4 attracting a huge amount of radon background
5 that's not there in the situation.

6 **MR. GRIFFON:** Yeah.

7 **DR. NETON:** And you -- I can usually see
8 getting --

9 **MR. GRIFFON:** Yeah.

10 **DR. NETON:** -- any negative numbers. My
11 recollection -- strange I remember this but the
12 detection limit for that system is 5.2
13 milligrams of thorium uranium 238 and about 38
14 micrograms reportedly in good conditions for U-
15 235. For some reason that rings a bell because
16 there was a lot of workers that had those
17 notations there. Yeah, it probably was --
18 yeah, the lung counter, we need to look at what
19 it was about. The lung counter was not as a
20 primary mechanism for control of exposures. It
21 was a sort of follow up to make sure they
22 weren't exceeding the 5 -- 15 rem lung doses in
23 that time period. And the urine sampling
24 program was more sensitive than the lung
25 counter by far but were insoluble. If you

1 believe the 120-day half-life that was used in
2 the -- I can't remember -- But interestingly
3 enough it does -- Jerry Barber at Y-12 went
4 back and looked at all the monitoring data
5 historically at one point and published an
6 article on how physics -- he came up with what
7 he called Q-class uranium which it fit pretty
8 well. Quarterly clearance class rather than --
9 than monthly. And it came out about 120. Most
10 of the uranium at Y-12 was in that -- that
11 ballpark. Interesting -- Interesting
12 exercise.

13 **DR. BEHLING:** Yes.

14 **DR. MAKHIJANI:** A couple of questions just for
15 clarifying the scientific issues in my head.
16 One would be that essentially the in vivo data
17 has to be disregarded even as a validation so
18 far as uranium is concerned because I mean
19 using the subtraction from them it becomes
20 quite variable and, you know, you have no idea.
21 It seems from the data that Hans showed me --
22 it seemed to be very difficult to make sense of
23 the in vivo data and I just wanted to --

24 **DR. BEHLING:** The low doses?

25 **DR. MAKHIJANI:** -- the impressionistic idea not

1 -- not the studied idea.

2 **DR. NETON:** It's very low incidence levels I
3 think that, you know -- this came up in the
4 original review, the Y-12 site profile; why
5 aren't we using the in vivo data more. And the
6 answer was that the urine sampling was much
7 more sensitive and would be more representative
8 of workers' exposures. Now, it doesn't mean
9 though you can't use the in vivo data as a
10 bounding estimate of some point to say okay, I
11 -- I -- my urine sample shows me a very massive
12 intake for some reason. It is a contaminated
13 sample. And I've got a -- and I want to see if
14 it possibly was. And I've got a urine -- I
15 mean in vivo count that was done and it shows
16 that it's much lower than what you'd expect.
17 Within certain limits one can make those
18 comparisons and -- and -- and use it to your
19 advantage. But -- But you're right, Arjun,
20 you've got to be careful when you start using
21 in vivo to do anything. In vivo normally -- I
22 never say always anymore but you will normally
23 use the in vitro urine data --

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

25 **DR. NETON:** -- as -- as an exposure indicator.

1 **DR. MAKHIJANI:** It -- It would seem to me that
2 if -- if the setup of the counter, and you
3 know, this is obviously I don't have field
4 experience in the way that you do -- but just
5 looking at the theory of how it was done and
6 the -- the data that Hans showed me and your
7 explanation, if -- if -- if the frequencies of
8 interest from the uranium and the thorium are
9 left and -- and -- and the counter is merely
10 centered on the cesium peak and you've got a
11 back stabber that you're subtracting out that
12 would alter significantly, if you -- you would
13 be left with a piece of data that would be
14 extremely uncertain and -- and very unreliable.
15 So my -- my question is how could you use -- it
16 would seem to me that so long as the other was
17 arranged in the way that this one seems to be
18 that you could not use that in vivo data; that
19 in vivo data has become unusable for uranium
20 235.

21 **DR. NETON:** Within certain limits. I mean I --
22 I -- I can -- I can guarantee that if you put
23 enough in front of that detector you start
24 seeing a photo 185. It's not insensitive. I
25 mean the intrinsic efficiency of that detector

1 is virtually 100 percent for 185 KPU's, so
2 thick it's got 100 percent intrinsic efficiency
3 capturing those photons. The question is when
4 does that intrinsic rise above his continuum
5 there --

6 **DR. MAKHIJANI:** Right.

7 **DR. NETON:** -- amidst the noise that might be
8 present from radon and (inaudible). There was
9 a calculable value there and it's not
10 worthless. I mean I wouldn't characterize it
11 as that at all. I'd say you have to be careful
12 because if you get somewhere above 100-and-
13 something micrograms I'm very certain you could
14 start to see -- you could start to see photons.

15 **DR. BEHLING:** But like I said, I -- I made a
16 copy of some of his historical and you can
17 certainly say one thing. Every time you see a
18 negative value that's obviously an error
19 because by definition that's an impossible
20 situation. And so it lends you some
21 understanding of the limitation of the data
22 when you have a minus 99 there's no explanation
23 for that other than to say it's in error.

24 **DR. NETON:** Well, it's...

25 **DR. BEHLING:** Well, it's an indication of the -

1 - of the statistics. By stripping something
2 out you end up unfortunately at times with a
3 negative value.

4 **DR. NETON:** It's -- It's not an error. It's -
5 - It's -- It's a number generated as a result
6 of this measurement process and it's -- it's an
7 indication of variability of the process.

8 **MR. GRIFFON:** Right.

9 **DR. NETON:** It's a valid number based on the
10 measurement. Now, how valid -- how uncertain
11 that is and can you come up with minus 99, how
12 does that bracket the uncertainty distribution
13 that we're trying to measure? That's
14 informative. It's not in error.

15 **DR. BEHLING:** Uh-huh.

16 **DR. NETON:** I mean I'm clear on that.

17 **DR. MAKHIJANI:** Looking at -- Looking at the
18 sort of rather large amount of stripping that
19 would have to have some value for -- for the
20 back stabber people from cesium, that -- that
21 would really -- I mean you'd have to have a
22 pretty well defined instruction for dose
23 reconstruction when they could use this because
24 a vast majority of them -- the vast majority of
25 this in vivo data would appear to be unusual up

1 to mid-1989.

2 **DR. NETON:** Again, I don't know unusable or
3 not. I mean within a certain limit. Now,
4 again we don't put a lot of -- of emphasis in
5 using the in vivo data other than for
6 confirmatory issues of let's say a person had a
7 sample here and someone argues you had an
8 incident a year ago and you -- you could have
9 had an intake or who knows how many micrograms.
10 Well, you can say, well, no, there's no
11 indication in this -- this path given, you
12 know, whatever the reliability of system.

13 **MR. GRIFFON:** I would also say we're getting
14 into TR discussion more than SEC discussion.

15 **DR. MAURO:** I'd like to point out that just
16 listening to this discussion, the level of --
17 of knowledge -- experience that's reflected in
18 this conversation. This I guess is caution.
19 If you're in a production mode and you're
20 moving out large numbers of cases and you have
21 300 health physicists moving through the
22 process, the kinds of judgments you're talking
23 about I certainly trust what I'm hearing.
24 Incredible health physics but I think that
25 you're in an -- in a -- in an area now where

1 you've got to be really careful.

2 **DR. NETON:** Oh, yeah.

3 **DR. MAURO:** Because this is not just turning
4 the crank now. There's a lot of judgment being
5 made here.

6 **DR. NETON:** Again I don't know -- I'm not aware
7 of any program -- could be where the workers
8 had in vivo accounts without urinalysis. I
9 mean we don't have any.

10 **MR. GRIFFON:** Right.

11 **DR. NETON:** It's not -- It's not like they
12 used in vivo as a cheap way out to monitor the
13 workforce. They are almost -- there may be
14 instances but typically they're always on some
15 prior assay frequency for urine and then a
16 lesser frequency for in vivo. Almost as a
17 safety check -- check, you know, are we missing
18 something here big time? Matter of fact,
19 you'll see big peaks on some people; more than
20 likely it's because external contamination. It
21 is possible. I -- I've seen positive counts
22 on these -- these -- these counters and I can
23 assure you that they are observable and, you
24 know, there's one, granted, what we would call
25 a standard peak search by today's technology,

1 but the detection limit is here.

2 **DR. MAKHIJANI:** Yes. I just wanted some --
3 some clarification.

4 **DR. NETON:** I totally agree that we have to be
5 careful in using the in vivo counter data.

6 **DR. BEHLING:** And what would be the default
7 value for in vitro urinalysis given the fact
8 that probably 30 to 40 DPM per 24-hour urine
9 excretion is probably the MDA value and -- and
10 would you be interested in looking to assign
11 that for all instances where there is below
12 MDA?

13 **DR. NETON:** Yeah. That's our standard
14 practice. We've done that a lot. Most of the
15 lung cancers that get paid on this program are
16 the result of a missed dose calculation --

17 **MR. GRIFFON:** Right.

18 **DR. NETON:** -- for people excreting urine below
19 -- what class below the detection limit in the
20 measuring process. So this means that if the
21 detection was 24 DPM we would assign not
22 necessarily 24 DPM, probably half of the MDA,
23 you know, if I modeled it, the uncertainty
24 propagated on there.

25 **MR. GRIFFON:** Zero to 24?

1 **DR. NETON:** Yeah, I think so. Zero to 24 --
2 That's been our standard approach and again
3 we've been -- we've had many -- numbers of
4 people go through here and never excrete a
5 positive sample in their -- in their work
6 histories that are coming out with lung doses
7 that are compensable based on just that and I
8 have no problem. That's the -- That's the
9 technology, limit of the technology.

10 **MR. GRIFFON:** I think we're through that one.

11 **ISSUE 8: INTERNAL DOSE DATA VALIDATION**

12 Issue eight and then we're done.

13 **DR. NETON:** Here's coffee, too if you want.

14 **MR. GRIFFON:** Don't need it now, right?

15 **DR. NETON:** We're winding down. Well, I don't
16 know. Is issue eight the dose reconstruction?

17 **MR. GRIFFON:** Oh, issue eight I added. This is
18 kind of an -- an add on.

19 **DR. NETON:** Oh.

20 **MR. GRIFFON:** But it's the internal dose val--
21 it wasn't really in the conference call --

22 **DR. NETON:** That -- That actually is included
23 in I think some of the material that I -- I
24 sent around yesterday. There is a -- a brief
25 mention of August of '55, the second item

1 listed speaks to an attempt at validating some
2 of the later external data as you see back
3 there. And the remaining one -- two -- two
4 write-ups speak to looking at HP reports and
5 trying to validate some of the -- some more
6 urine data. Although I think in looking at it
7 this morning it appears that the HP October '53
8 report is a rehash of what's in our evaluation
9 report. So really the only new one here that
10 we were able to look at for the health physics
11 --

12 **MR. GRIFFON:** '55.

13 **DR. NETON:** -- was the '55 and the '53 HP
14 report which talks about average weekly
15 excretion rates and DPM for 24 hours and
16 there's very good -- ex-- perfect agreement
17 with the exception of sample number four there
18 where you see that the electronic database had
19 a -- a weekly average of U32 versus -- help me
20 out here, Tim. These columns are labeled the
21 same.

22 **MR. GRIFFON:** Yeah, they are the same.

23 **MR. ADLER:** The one on the left is the document
24 that the report --

25 **DR. NETON:** Okay. So the document for this

1 particular individual had a weekly average that
2 was slightly higher but there's perfect
3 agreement among the other samples. And I won't
4 ascribe any value judgments in there other than
5 that's what we can see.

6 **MS. MUNN:** We can see, yeah.

7 **MR. GRIFFON:** And similarly on the bottom
8 table, right?

9 **DR. NETON:** Yeah.

10 **MR. GRIFFON:** Except for the 110 versus 13?

11 **DR. NETON:** Right.

12 **DR. BEHLING:** Why is there a pretty big -- been
13 labeled as average weekly if it's at 20 DPM in
14 the 20 -- I mean what does the weekly refer to?

15 **DR. NETON:** I don't know. These are weekly
16 samples so -- and I didn't do this comparison
17 so I'm not going to be able (inaudible) labels.
18 That must have been the label on the report and
19 that's just carried over from the report. My
20 guess is, and I can't confirm this at this
21 point but if you take a weekly sample, usually
22 they had a two-day -- two-day off the work
23 period and took a sample.

24 **DR. BEHLING:** But it's strictly a 24-hour urine
25 sample that was?

1 **MR. GRIFFON:** It says 24 hours.

2 **DR. NETON:** Unless -- Unless this is -- I got
3 to be careful here. This could be actually
4 over a period of time. Do you know what I'm
5 saying? I mean if they had 52 weeks or a
6 quarter.

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

8 **DR. NETON:** I honestly don't know. I'd have to
9 check --

10 **MR. GRIFFON:** That might be good.

11 **DR. NETON:** -- with Bill Tankersley on that.
12 But it's a good question, Hans. I don't know
13 the answer.

14 **MS. MUNN:** But in either case --

15 **DR. NETON:** Even --

16 **MS. MUNN:** The data agrees.

17 **DR. NETON:** -- the numbers appear to be fairly
18 close.

19 **MR. GRIFFON:** And so the '55, and that would
20 report as one of the ones hung up in
21 classification, right?

22 **DR. NETON:** Yes.

23 **MR. GRIFFON:** That '55?

24 **MS. MUNN:** I think what we're after is
25 agreement. The assurance that the CER is okay.

1 **DR. NETON:** And, you know, this is sort of
2 similar to concluding the cancer with the other
3 -- They're not perfect but they're --

4 **MS. MUNN:** No. You wouldn't expect them to be.

5 **MR. GRIFFON:** I guess there was no more of
6 those percentile curves though.

7 **DR. NETON:** If I -- I got --

8 **MR. GRIFFON:** That's what I was hoping for.

9 **DR. NETON:** I specifically asked that question
10 could we get these percentile curves out of the
11 data that are still not -- haven't been
12 reviewed for classification?

13 **MS. MUNN:** I can't conceive it myself.

14 **MR. GRIFFON:** Those reports change over time.
15 Different authors, different, you know --

16 **DR. NETON:** Bill Tankersley assured me that
17 there were no ones that he could locate anyway
18 for comparisons.

19 **DR. MAKHIJANI:** There's one -- one discrepancy
20 that's rather large.

21 **DR. BEHLING:** And it's that 110 13?

22 **DR. MAKHIJANI:** Yeah.

23 **DR. NETON:** Yeah.

24 **DR. MAKHIJANI:** Everything else looks alright.

25 **DR. NETON:** Yeah, I agree. I'm not sure. We

1 can follow up and see what -- what may be the
2 basis of that.

3 **MR. GRIFFON:** And just follow up and tell us
4 what these values, you know...

5 **DR. NETON:** Yeah.

6 **MR. GRIFFON:** In other words, it looks --
7 another piece of data to fill in. I think the
8 internal one was the stronger -- you have more
9 strength in the case there anyway.

10 **DR. NETON:** We have three or four --

11 **MR. GRIFFON:** Right.

12 **DR. NETON:** -- forms for comparison in this
13 case. Again, 50-year-old data is never perfect
14 but it gives at least me a pretty good sense
15 that we're -- we can chase it through this one.

16 **MS. MUNN:** In my experience one-year-old data
17 is not perfect, transcribed from one thing to
18 another.

19 **DR. NETON:** Yeah.

20 **MS. MUNN:** And any time you enter -- disperse
21 information with human activity.

22 **MR. GRIFFON:** Well, then you probably have
23 typos.

24 **MS. MUNN:** Yeah.

25 **MR. GRIFFON:** That's why I was impressed with

1 those percentile curves and all those graphs
2 they did, all by hand.

3 **MS. MUNN:** Yeah.

4 **MR. GRIFFON:** A lot of work.

5 **DR. NETON:** Look at those memos on the external
6 side. I mean they were clearly using IBM
7 keypunch --

8 **MS. MUNN:** Hodge-podge.

9 **DR. NETON:** -- computer technology back in the
10 early '50s.

11 **MS. MUNN:** Yep.

12 **DR. NETON:** For -- To generate punch cards for
13 -- for the data and keeping track of them and
14 stuff.

15 **MR. GRIFFON:** Yeah, I think there were --

16 **DR. NETON:** They were using modern technology
17 to their advantage.

18 **MR. GRIFFON:** Yes, right.

19 **MS. MUNN:** I think --

20 **DISCUSSION OF SAMPLE DR'S**

21 **MR. GRIFFON:** And then the last thing I have on
22 the list is just a good discussion of the
23 sample DR's.

24 **DR. NETON:** Some of these are probably going to
25 become not important at this point if we're

1 going to rethink our approach to cyclotron
2 workers. I think at least one, maybe two of
3 them are -- are in that.

4 **MR. GRIFFON:** Are related to that.

5 **DR. NETON:** In that area.

6 **DR. MAKHIJANI:** And about the plutonium one I
7 don't think there was a question.

8 **DR. NETON:** Maybe -- Maybe I could start
9 there, if there's any questions on these. But
10 I -- I really -- I prefer to answer your
11 questions rather than me just go over them.
12 But honestly I -- I have them here in front of
13 me. I may or may not be able to answer
14 specific questions because I -- it's been
15 awhile since I've -- I've refreshed my memory
16 on some of them.

17 **DR. MAKHIJANI:** I have the same question on one
18 and three.

19 **DR. NETON:** Okay.

20 **DR. MAKHIJANI:** Which was that it says that the
21 highest exposed people were monitored for
22 neutrons.

23 **DR. NETON:** Uh-huh.

24 **DR. MAKHIJANI:** And I try to follow the
25 reference trail to that statement and I went to

1 Dr. Kerr's paper from 2004 I think, the part
2 two of that extended dose paper.

3 **DR. NETON:** Uh-huh.

4 **DR. MAKHIJANI:** And that actually referred --
5 that statement was not as strong in that paper
6 but it was there. But it referred me to the
7 TBD. And in the TBD I did not find a clear
8 statement the neutron monitoring all the way
9 back to 1949, that all the people with the
10 highest exposure -- exposure potential were
11 monitored. It did provide me a reference to
12 the 1949 May health physics report which I then
13 looked back and I did not find any statement
14 about monitoring critical (inaudible). This is
15 from a relatively quick survey of these
16 documents. I might be mistaken. Let me just
17 make that caveat. But as I understood the
18 health physics report they -- they essentially
19 indicated that that's when they started neutron
20 monitoring but no (inaudible) was indicated.

21 **MR. KERR:** Actually they started monitoring
22 earlier than that for neutrons.

23 **MS. MUNN:** Get close to a mike, George.

24 **MR. KERR:** You'll get in trouble.

25 **DR. NETON:** Okay.

1 **MR. KERR:** Here's some neutron monitoring data,
2 a little bit like from '49. That was their
3 first attempt. I think that it'll start adding
4 -- they used -- earlier they used some neutron
5 sensitive ion chambers or PIC's to get the
6 workers. But in '52 they started printing NTA
7 films in the badges with the beta gamma. But
8 if you go back and look, typically what they
9 did --

10 **DR. MAKHIJANI:** '52?

11 **MR. KERR:** '52 is when they started putting the
12 NTA films in. If you go back and look the
13 indications I have is that they were monitoring
14 anybody who was in an area where they could get
15 a neutron exposure. And I think you'll find
16 that's stated in -- in the books. Here they --
17 if you were in an area where neutrons were
18 being produced you had an NTA film. Now, the
19 one thing they didn't do is they didn't always
20 develop those films and look at them unless the
21 HP in that area said that these people had
22 worked in a neutron field that week. They --
23 Part of the reason they had some indication
24 that he had, he was probably looking at the
25 pocket ionization chambers. Then the films

1 were developed and read. But if you worked in
2 a neutron area you had a neutron film in your
3 badge. And I think in the cyclotron they
4 probably -- anyone who went in and worked
5 around a cyclotron that week, you know, had one
6 of those. Now, some of the supervisors didn't.
7 As a matter of fact if -- if you look under
8 cyclotron crew in 1954 you'll see Alvin
9 Weinberg's name. But I doubt if Alvin Weinberg
10 was over there every day working at the
11 cyclotron. Because usually it says, you look
12 at his badge, not used.

13 **MS. MUNN:** Not used.

14 **MR. KERR:** Not used. But anyway, they did
15 monitor. Everyone had a potential for neutron
16 exposures. If you worked in an area where
17 there were neutrons you had an NTA film in your
18 badge.

19 **DR. MAKHIJANI:** That -- That's the statement
20 that I could not find a reference for because
21 it's made in the BR's, in both the neutron
22 BR's. I tried to follow the paper trail so far
23 as I could and I'm sure I didn't follow the
24 whole paper trail.

25 **MR. RUTHERFORD:** So you're looking for like

1 something back in the --

2 **DR. MAKHIJANI:** There --

3 **MR. RUTHERFORD:** -- like an HP report or
4 something that says all personnel and --

5 **DR. MAKHIJANI:** Right. Something like that.

6 **DR. NETON:** I have something to that effect
7 here. I can't locate it. I can provide you
8 that.

9 I think -- I think I just saw this in
10 reference to one of these incidents where some
11 people strayed into a neutron area
12 accidentally. There was an evaluation in '51
13 and it basically talked about who was, you
14 know, why people were monitored for neutrons,
15 who was monitored. We need to pull that out.

16 **MR. GRIFFON:** And this was in case one and
17 three?

18 **DR. MAKHIJANI:** Yeah, the same statement was
19 made in case one and three. And the reason I
20 kind of started tracking this is -- is -- well,
21 one reason is that it went back to 1949 when
22 there was very little monitoring going on so I
23 thought it was -- would be rather extraordinary
24 and so I wanted to track down the statement.
25 And then -- But according to what you -- I'm

1 not sure -- I'm not sure I followed everything
2 you said but the universal monitoring from
3 neutron exposure would have started in '52 when
4 they put the NTA film. And before that they
5 were giving PIC's but there was some
6 monitoring.

7 **MR. KERR:** Yeah, they had -- they -- they used
8 PIC's before. A cyclotron crew in '50 and '51
9 had -- there's -- there's two kind of pocket
10 ionization chambers you can find. One of them
11 typically had boron in it so if you wore it on
12 the body it was sensitive to reflected
13 neutrons. And some of them actually had a, I
14 want to say Teflon. I'm not sure if they had
15 Teflon back in those days but they were some
16 that had a some kind of a plastic in them that
17 would give you a little better response to some
18 fast neutrons. But I think the ones they were
19 using mainly were the boron coated ones. And
20 nevertheless, if you calibrated them on -- on a
21 body and saw a reflected neutrons it's just
22 like the albito (ph) dosimeters today. You
23 don't see (inaudible) neutrons.

24 **DR. NETON:** I would also point out I guess that
25 the -- the main source of neutron exposures

1 were the cyclotrons which is what we're trying
2 to do here. And depending on the outcome of
3 our evaluation what we're doing with cyclotron
4 operators --

5 **MR. GRIFFON:** Oh, yeah, a moot point.

6 **DR. NETON:** This may or may not be a -- a
7 relevant issue.

8 **DR. MAKHIJANI:** This issue might go away.

9 **DR. NETON:** This issue would more than likely
10 go away -- would go away if we added cyclotron
11 operators to the SEC.

12 **MR. GRIFFON:** Can I ask this one follow-up
13 question?

14 **MR. KERR:** The only other known site was the
15 (inaudible). That was another one where people
16 were exposed to neutrons on a regular basis.

17 **MR. GRIFFON:** And the -- the criticality
18 accident of '58, was there a special treatment
19 when you'd do DR's for people that were
20 potentially involved in that accident? Was
21 there a --

22 **DR. NETON:** You've got the whole report, yeah.

23 **MR. GRIFFON:** Yeah, you have the whole report.

24 **DR. NETON:** It was published yesterday by...

25 **DR. MAKHIJANI:** I saw it -- I downloaded it

1 this morning.

2 **DR. NETON:** We have -- We have George's write-
3 up which is out there for --

4 **MR. KERR:** It was just put on -- it was put on
5 the O-drive I guess for anyone that wants to
6 look at it.

7 **DR. NETON:** I guess what you're asking though
8 is are dose reconstructors especially cautioned
9 --

10 **MR. GRIFFON:** Right.

11 **DR. NETON:** -- other than through the fact of
12 their training --

13 **MR. GRIFFON:** -- through their training.

14 **DR. NETON:** -- and the fact --

15 **MR. GRIFFON:** There's probably -- There's
16 probably a listing of who was involved in this
17 and --

18 **MR. KERR:** If you'll look --

19 **MR. GRIFFON:** -- and then it comes up a --

20 **MR. KERR:** If you'll look in the back of that
21 there is a reference that says official use
22 only. And that is the 20 -- the names and the
23 Social Security numbers of the 23 people --

24 **MR. GRIFFON:** All right.

25 **MR. KERR:** -- that we have data on, and that's

1 on the O-drive. It's not part of the report.

2 **MR. GRIFFON:** And that listing, I've come
3 across that and I think it only has a -- a
4 photon disk doesn't it, or does it -- what --

5 **MR. KERR:** It's got both.

6 **MR. GRIFFON:** It's got both? Not --

7 **MR. KERR:** Neutrons and gammas both.

8 **MR. GRIFFON:** Not what I saw so maybe I -- if
9 it's a -- it's a specific case I won't get into
10 that.

11 **DR. NETON:** Well, the evaluation report went to
12 great lengths to -- to figure out the neutron
13 dose. I mean they actually irradiated a burro.

14 **MR. GRIFFON:** Yeah, I know. I know. I've seen
15 that report, too.

16 **DR. NETON:** It's pretty -- It's pretty --
17 Scientifically it's pretty interesting.

18 **MR. GRIFFON:** Oh, yeah. They went to great
19 lengths to recreate it.

20 **DR. NETON:** It's not great that it happened.

21 **MR. GRIFFON:** Right. Right.

22 Now, are we going through case by case, Arjun,
23 or can I bring up the case numbers and see if
24 there's -- have questions on those?

25 **DR. NETON:** Might be good, yeah.

1 **MR. GRIFFON:** I mean can I -- can I go to the
2 case numbers and ask if anybody has questions
3 on this case?

4 **DR. NETON:** Sure.

5 **MR. GRIFFON:** I am -- case one we just kind of
6 talked about, right?

7 **DR. MAKHIJANI:** Yeah. On case one I had one
8 more question.

9 **MR. GRIFFON:** Okay.

10 **DR. MAKHIJANI:** We're using the neutron photon
11 ratio and I guess for an unmonitored dose
12 they're using the back.

13 **MR. GRIFFON:** So we've already discussed the
14 back extrapolations. That covers that I think.

15 **DR. NETON:** I hope.

16 **MR. GRIFFON:** Yeah. I don't want to go back
17 there.

18 **DR. NETON:** It's too late in the day.

19 **DR. MAKHIJANI:** I think on -- on number one I
20 don't have any more questions.

21 **MR. GRIFFON:** And you what, I may have an old
22 file here but I have one, three, five, six,
23 seven and eight. Do you have other -- you
24 provided different cases than that, didn't you?

25 **DR. NETON:** Yeah, there's four. There's one

1 through eleven and three and two and --

2 **MR. GRIFFON:** Should have gotten my other
3 computer.

4 **DR. NETON:** Yeah. I left the numbers on there
5 because it got too confusing --

6 **MR. GRIFFON:** Yeah.

7 **DR. NETON:** -- to renumber them after we started
8 doing numbers. Four, five, six, seven, eight,
9 ten and eleven.

10 **MR. GRIFFON:** Okay. So anyway, One -- One --
11 Three is the next one, right?

12 **DR. NETON:** Three is the next one. That's an
13 unmonitored neutron reconstruction.

14 **MR. GRIFFON:** Three is similar, right?

15 **DR. NETON:** Similar, very similar.

16 **DR. MAKHIJANI:** I have the same question.

17 **MR. GRIFFON:** Okay. How about four?

18 **DR. NETON:** Okay. Four is extremity.

19 **DR. MAKHIJANI:** Four -- I'm trying to open up
20 Joyce's file here.

21 **DR. NETON:** Four is extremity.

22 **DR. MAKHIJANI:** Four. Sorry, yes. I didn't
23 have any questions about four.

24 **MR. GRIFFON:** When you get to the recycled
25 uranium one you have questions on that.

1 **DR. MAKHIJANI:** I want to open Joyce's file.

2 **MR. GRIFFON:** Okay.

3 **DR. NETON:** Five is a uranium dose
4 reconstruction with enriched uranium. This is
5 during the period when there was no monitoring
6 data so you're looking at '48 and '49 and in
7 '50.

8 **MR. GRIFFON:** So this is starting on the model
9 you just described back in '52?

10 **DR. NETON:** Right. So these co-worker intake -
11 -

12 **DR. MAKHIJANI:** I'm sorry. This takes me a
13 minute.

14 **DR. NETON:** That's all right.

15 **MR. GRIFFON:** And I want to assume -- I'm
16 talking about -- that one assumes no RU because
17 of the time period, right?

18 **DR. NETON:** Correct. It's a straight -- pretty
19 much straight out calculation if you buy the
20 co-worker model.

21 **DR. MAKHIJANI:** Are we on five or four?

22 **DR. NETON:** Five.

23 **DR. MAKHIJANI:** Five? Yes, okay. All right.

24 **MR. GRIFFON:** Anything on five, Arjun? Are you
25 still looking?

1 **DR. MAKHIJANI:** Yeah, co-worker model from '48
2 to '49. I think we covered that.

3 **MR. GRIFFON:** Yeah.

4 **DR. MAKHIJANI:** Right. Right. I -- I just
5 want to review my notes in here.

6 **MR. GRIFFON:** Okay. Yes, I had the ten times
7 question. Yeah. No, I don't have any
8 questions.

9 **DR. NETON:** It's not on file.

10 **DR. MAKHIJANI:** Yeah. And I don't have any
11 questions on five.

12 **MR. GRIFFON:** Arjun, is there -- this is a
13 little bit of a side question, more -- more DR
14 related but for my own education. Is there a
15 Y-12 specific like DR guideline for how when
16 you're -- when you're back calculating some
17 real bioassay data how that this matrix would
18 treat LOD values, how they'll treat -- because
19 you can either treat them less than LOD, real,
20 and it has different implications obviously.
21 Is there a guideline?

22 **DR. NETON:** I -- I suspect that's in one of
23 the tools or workbooks but I --

24 **MR. GRIFFON:** Yeah.

25 **DR. MAKHIJANI:** Oh, there is a question on

1 five.

2 **MR. GRIFFON:** I'm sure that's already in that
3 tool.

4 **DR. NETON:** I know. I can't give it to you off
5 the top of my head but --

6 **MR. GRIFFON:** But those aren't necessarily
7 procedures. They're --

8 **DR. NETON:** No.

9 **MR. GRIFFON:** -- tools, right?

10 **DR. NETON:** Those tools are very -- I was
11 looking at one yesterday for the -- I forget
12 what it was now. Extremely elaborate.

13 **MR. GRIFFON:** Yeah. And they tend to be fairly
14 prescriptive.

15 **DR. NETON:** Yeah. PIC here, PIC there, PIC --

16 **DR. MAKHIJANI:** Joyce had a comment on number
17 five.

18 **DR. NETON:** Okay.

19 **DR. MAKHIJANI:** She said that chronic intake
20 was considered and the most claimant favorable
21 way would be to calculate acute intake on the
22 first day of work. She got a somewhat higher
23 dose. Not very much higher for the colon but
24 it would make significant difference for other
25 organs. That was her comment.

1 **DR. NETON:** That's sort of a generic comment on
2 how we're approaching this whether it's chronic
3 or acute. I mean that -- that may be tied up
4 in this site profile review issue that Joyce
5 has made.

6 **MR. GRIFFON:** Probably not an SEC issue.

7 **DR. NETON:** She's made that comment in the
8 past.

9 **DR. MAKHIJANI:** Yes, I agree.

10 **MR. GRIFFON:** That's probably not an SEC issue.

11 **DR. BEHLING:** But what -- what would be the
12 basis for you to --

13 **DR. NETON:** We acknowledge that this is another
14 point of issue that we need to talk about with
15 you guys but, you know, we need to get the
16 plausibility versus reasonable.

17 **MR. GRIFFON:** I agree.

18 **DR. MAKHIJANI:** I would agree that it's not an
19 SEC issue. But you have Joyce's comment.

20 **DR. NETON:** I understand.

21 **MR. GRIFFON:** So are we on six then?

22 **DR. NETON:** Yeah, six is very similar in the
23 sense that SC&A was looking for how we would
24 handle all of these compounds and I think the
25 various chemical forms of uranium in the

1 exposure scenario and -- and the dose
2 reconstructor apply the more claimant favorable
3 chemical form to come up with a dose for --
4 this was a colon --
5 I think there may have been a one-year recycled
6 uranium exposure here because it ended in '53
7 which is a time period that recycled uranium
8 came into play and it included that in the dose
9 reconstruction so this is virtually the same
10 dose reconstruction as number five with the
11 exception that we had to pick the most claimant
12 favorable solubility class.

13 **MR. GRIFFON:** And --

14 **DR. NETON:** And we had to do the recycled
15 uranium which may get into Arjun's question
16 about what we used for recycled uranium. I'm
17 going to stick to your question.

18 **DR. MAKHIJANI:** No. No. Feel free to --

19 **DR. NETON:** I'm going to hang myself on my own
20 comments. Well, I -- Let me see. I don't
21 recall honestly what we did here other than
22 highly (inaudible). Attention, recycled
23 uraniums were not included until '53. They
24 were not introduced --

25 **MR. GRIFFON:** Until what part of '53?

1 **DR. NETON:** Well, until '53 so they added all
2 of '53.

3 **MR. GRIFFON:** Okay.

4 **DR. NETON:** I don't see here --

5 **MR. RICH:** Is there an indication of intake
6 rate?

7 **DR. NETON:** Intake rate per day is assigned.
8 It looks like it was assigned right out of the
9 site profile because that -- that looks like
10 the table that -- do you remember that table
11 that was in -- George -- I mean Bryce?

12 **MR. RICH:** Yes.

13 **DR. MAKHIJANI:** One of the cases I think she
14 said this was not the only argued case, right?

15 **DR. NETON:** No. I think the next one is.

16 **DR. MAKHIJANI:** The next one is, yes. Case
17 number eight I think was the one where --

18 **DR. NETON:** Here it is.

19 **DR. MAKHIJANI:** -- she found that one?

20 **DR. NETON:** I just want to look at Bryce Rich's
21 table real quick because I think it's got an
22 excerpt out of --

23 **MR. RICH:** It has an excerpt out of the TBD.

24 **DR. NETON:** Yeah. Where is that, Bryce?

25 **DR. MAKHIJANI:** The 110?

1 **DR. NETON:** I thought the intakes were listed
2 there but apparently they're not.

3 **DR. MAKHIJANI:** Not the intakes.

4 **DR. NETON:** No, you're right. There are what
5 to assign.

6 **MR. RICH:** It just -- It's just a ratio of the
7 uranium and (inaudible).

8 **DR. NETON:** I can't speak to what these numbers
9 were other than they appear to be standard
10 recycled uranium numbers. There's no
11 indication in this dose reconstruction as to
12 why they didn't use the upper limit. I can't
13 speak -- does she make that comment on this
14 example or is there another one?

15 **DR. MAKHIJANI:** She made the comment on example
16 number eight.

17 **DR. NETON:** Okay.

18 **DR. MAKHIJANI:** But the same may be applicable.

19 **DR. NETON:** Well, let me look and see what the
20 table -- tables may be. Number eight doesn't
21 even list the tables. That's interesting.

22 **DR. MAKHIJANI:** Yeah, I think -- it didn't seem
23 to me that in the case of this worker that a
24 factor of ten reduction should be taken.

25 **DR. NETON:** Yeah, it doesn't say that anywhere

1 in here.

2 **DR. MAKHIJANI:** It doesn't say that but that
3 was how her calculation -- when she used the
4 ratio --

5 **DR. NETON:** Okay.

6 **DR. MAKHIJANI:** -- she got numbers that were
7 higher than hers.

8 **DR. NETON:** Let's -- Let's make a note of that
9 and we'll get back to you because there's no
10 indication there's dose reconstruction. That's
11 what they did. I trust Joyce's calculation.
12 We just need to go back and figure out if we
13 indeed did that why we did it and explain it.
14 If not then maybe this -- this was improperly
15 done. I can't -- I can't answer the question
16 now though. It would have been nice if the
17 table had been in here. We'll -- We'll get
18 back to you on that. Number seven was --

19 **DR. MAKHIJANI:** Before we move, number six I
20 think she had the same comment. It didn't say
21 so explicitly but that I can see from her
22 comment that there is a kind of implicit idea
23 that there should have been some acute intakes.
24 Application of -- I'll just read what she said
25 instead of trying to interpret it. Application

1 of chronic intake using MDA with the
2 (inaudible) not claimant favorable. Two sets
3 of data should have been applied to determine
4 the missed dose, 1/1/50 to 5/30/52 and 7/15/52
5 to 12/31/52. I can -- I can put these in a
6 little file --

7 **DR. NETON:** That would be good.

8 **DR. MAKHIJANI:** -- and send them to you.

9 **DR. NETON:** Just send them to us and then we
10 can react to them.

11 **DR. MAKHIJANI:** The -- The ones that -- that -
12 - ones that are outstanding maybe I'll just
13 write a little memo for you.

14 **DR. NETON:** I think that would be good because,
15 you know, these are difficult technical things
16 to try to --

17 **DR. MAKHIJANI:** Yeah. That's why as I was
18 reading it I realized it's not --

19 **DR. NETON:** Yeah, I'm not good enough to do
20 these type of calculations in my head.

21 **DR. MAKHIJANI:** I'll just send you.

22 **DR. NETON:** I think that would be good. Okay.
23 Then number seven was the -- was the -- was not
24 a dose reconstruction. It was essentially a
25 placeholder talking about the Paducah plant ash

1 material --

2 **MR. GRIFFON:** Right.

3 **DR. NETON:** -- and why we didn't believe that
4 was a -- a dose reconstruction or SEC issue
5 anyway. And then ten goes away and eleven, the
6 polonium aspect goes away.

7 **MR. GRIFFON:** And there wasn't a nine so --

8 **DR. NETON:** Nine I dropped because -- for some
9 reason. I think we had the general --

10 **MR. GRIFFON:** Yeah, we were --

11 **DR. NETON:** Now, eleven is a polonium and
12 plutonium. Right, right, right. And so, you
13 know, we're talking about the polonium exposure
14 for the cyclotron workers and how we -- we may
15 not be able to do those. The polonium was
16 reconstructed right out of the -- the Delta
17 View data center.

18 **MR. GRIFFON:** Plutonium.

19 **DR. NETON:** Sorry, plutonium. And so in my
20 mind we took the highest values out of that
21 data set to reconstruct them. And so I think
22 there was some comments made that we didn't yet
23 have a valid co-worker model but this was to
24 serve a plausibility bounding analysis so we
25 said, well, let's pick the highest value we

1 have of anybody exposed to plutonium in -- in
2 that time period and use it. And that's what
3 we did. Of course, the -- the values came out
4 pretty high. Lung, bone and liver were all
5 well over 90 percent. Colon, interestingly
6 enough, though, was still less than 20 percent.
7 Which is what you expect. I mean these were
8 metabolic organs for plutonium and based on
9 missed dose from any plutonium intake you're
10 going to have them in fairly large -- large
11 doses. And plutonium was exposed in the
12 calutrons, right? That was --

13 **MR. RUTHERFORD:** Uh-huh. Yeah.

14 **DR. NETON:** They were -- They were separating
15 and enriching the plutonium in some isotope I
16 think. Interestingly enough when I -- I first
17 started graduate school I measured plutonium in
18 autopsy tissues of people who died in the
19 Bowery of New York City and I got always great
20 plutonium 242 as a tracer. It always came from
21 Y-12. Now I know exactly how it was
22 manufactured. I always wanted to say how do
23 you get plutonium 242 pure as an isotope by
24 itself? This is the way. Kind of interesting.

25 **MS. MUNN:** See? If you stick around long

1 enough you learn all kinds of stuff.

2 **DR. WADE:** And then you forget most of it.

3 **DR. NETON:** And you forget most of it.

4 **MR. RUTHERFORD:** You have a brain with the
5 magnitude to store it all, too.

6 **MR. GRIFFON:** And that brings us through the
7 cases, right?

8 **DR. NETON:** I think so.

9 **DR. MAURO:** I just wanted to mention something
10 before we started getting close to the end.
11 Joe Fitzgerald just mentioned to me that he
12 thought this might be an -- since we're
13 finished up early he was planning on getting
14 Brant Ulsh on the line to talk a little bit
15 about Rocky. Is there any interest in staying
16 on about another half hour or so?

17 **MR. GRIFFON:** Just to do an update though.

18 **DR. MAURO:** Just an update -- just a --

19 **MR. GRIFFON:** Not a -- Not a --

20 **DR. MAURO:** -- where, you know -- sort of --

21 **MR. GRIFFON:** Not a transcribed --

22 **DR. MAURO:** Not transcribed.

23 **MR. GRIFFON:** What I think we said was an
24 informal call.

25 **DR. MAURO:** Right. An informal, non-

1 transcribed, just to take advantage of the fact
2 that we're all sitting around the table.

3 **DR. NETON:** That's fine. So we're going to go
4 off the record at this point?

5 **DR. MAURO:** Close it out first.

6 **MR. GRIFFON:** Well, first make sure -- we'll
7 close it out first, yeah, but I think -- I
8 think we could do that, yeah.

9 **DR. WADE:** One thing I'd like to talk about --

10 **MR. GRIFFON:** I don't know how we'd get to the
11 airport right now either with that thunder and
12 lightning.

13 **DR. WADE:** I'd like to talk a little bit about
14 what might unfold in our meeting in June. Now,
15 I did allow a significant amount of time for
16 the Y-12 SEC discussion. I guess the -- going
17 into it is there's the possibility that NIOSH
18 could be issuing an addendum to its evaluation
19 report. You know, that addendum could be
20 presented to the Board. And then the working
21 group could present. The Board could decide to
22 vote, to take it off the table and vote. The
23 Board could decide not to. So I guess we need
24 to be thinking about those things as we lead up
25 to -- lead up to the meeting.

1 **DR. MAKHIJANI:** Dr. Wade, if an addendum is
2 actually presented I want -- it would be good
3 to have some sense from Wanda and Mark whether
4 we would be doing something with that or
5 whether we just sit back and watch the rest
6 unfold and whether we've kind of done our
7 support work for the Board sufficiently that
8 you don't expect anything more of us other than
9 the one or two cleanup items here. But I think
10 the one on the table 45-B I think is what I'm
11 responsible for.

12 **DR. NETON:** Yeah. Those are about the only
13 issues I can --

14 **MR. GRIFFON:** Yeah.

15 **DR. NETON:** -- think of.

16 **MR. GRIFFON:** I mean it partially depends on
17 what your addendum says so --

18 **DR. WADE:** But hypothetically speaking the
19 addendum could go to the issues of calutron
20 workers. It could go to the issue of an
21 additional building for -- or buildings for
22 thorium.

23 **MR. GRIFFON:** And then maybe issues where we --
24 we as a worker Board or Board, whether we've
25 discussed it enough with SC&A and there's no,

1 you know -- or we may get it and say, you know,
2 depending on what we add in, we may.

3 **DR. NETON:** Lew's right. If we did --

4 **MR. GRIFFON:** Need further assistance, right.

5 **DR. NETON:** If we did add cyclotron workers --

6 **MR. GRIFFON:** Right.

7 **DR. NETON:** -- and the appropriate buildings
8 for thorium in it seems like the technical --

9 **MR. GRIFFON:** Right.

10 **DR. NETON:** -- issues are, with the exception
11 of the -- the co-worker model and some -- some
12 checking of table 45-B --

13 **MR. GRIFFON:** Right.

14 **DR. NETON:** -- were pretty much --

15 **MR. GRIFFON:** I think we're there.

16 **DR. MAKHIJANI:** I think so, I just wanted to
17 make sure.

18 **MR. GRIFFON:** I think so, too, but I don't know
19 how you're going to come out yet and neither do
20 you, right? So --

21 **DR. NETON:** Yeah. I -- I can't -- I don't
22 want to --

23 **MR. GRIFFON:** The Board's unlikely, but I think
24 --

25 **DR. WADE:** The Board might have some questions

1 for DOL at that point. We'll try to get DOL
2 there. So depending on how it plays out it's
3 possible the Board will be voting on the Y-12
4 SEC petition. That's also a possibility.

5 **MS. MUNN:** I'd hope so.

6 **DR. WADE:** Well, I personally hope we do.

7 **MS. MUNN:** A lot of people hope so.

8 **DR. MAURO:** Mark, I presume we're still in a
9 sit and wait for further directions from you
10 and the working group on whether you'd want us
11 to prepare any work product?

12 **MR. GRIFFON:** Well, you have the one task that
13 Arjun mentioned --

14 **DR. MAKHIJANI:** Okay. Yeah.

15 **MR. GRIFFON:** -- with the --

16 **DR. MAKHIJANI:** And I'll -- I'll do that. I -
17 - I need some information from NIOSH to be
18 able to do it.

19 **MR. GRIFFON:** And then I know you guys will be
20 keeping track of some -- small -- smaller items
21 but -- but --

22 **DR. NETON:** I -- I will -- I'm not going to be
23 available next -- starting Saturday through
24 next Friday.

25 **DR. MAKHIJANI:** Me, too, so --

1 **DR. NETON:** I know time is of the essence --

2 **MR. GRIFFON:** Yeah.

3 **DR. NETON:** I'm going to try to read email but
4 I'm going to be way far away.

5 **MR. RUTHERFORD:** I can help coordinate --

6 **DR. NETON:** So make sure anything that goes to
7 me also is cc'd to -- to Bomber so that he can
8 at least be aware of the issue and somehow get
9 the message to me that I may need to do
10 something although I'm sure he's totally
11 capable of --

12 **MR. GRIFFON:** Some of these points -- I mean
13 some of these things I saw you taking notes but
14 --

15 **DR. WADE:** I got it all down I think.

16 **MR. GRIFFON:** Just putting some of these
17 documents on the O-drive, and the faster that
18 can happen obviously.

19 **DR. WADE:** But I don't want to hold up for
20 example this 53-B analysis.

21 **MR. GRIFFON:** Right.

22 **DR. WADE:** I think it's important. The quicker
23 we can get a consensus on this issue the better
24 off we're going to be and if it takes a small
25 phone call among ourselves again, you know,

1 we're probably willing to do that.

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

3 **DR. WADE:** Whatever -- Whatever it takes.

4 **MR. GRIFFON:** And I would leave open the -- if
5 we need another informal call in between now
6 and then. I think it's totally appropriate.

7 **DR. WADE:** We, of course, can't issue our
8 supplement to you until we -- we issue it in
9 general to the petitioners as well as the
10 Board.

11 **MR. GRIFFON:** Right.

12 **DR. WADE:** But as soon as that happens we'll
13 notify you that it's available. And I know
14 there's going to be pressure on us if we're
15 going to issue a supplement to get it out
16 sooner than later. There are certainly
17 requirements about federal register notices and
18 just common courtesy that need to be -- be
19 brought into play.

20 **DR. NETON:** We have our Board meeting in about
21 three weeks out?

22 **MS. MUNN:** Yeah.

23 **DR. WADE:** Amazing.

24 **MR. GRIFFON:** Okay. I think that we're set to
25 close out. Anybody else have anything else?

1

Then I think we can adjourn this -- adjourn

2

this work group.

3

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7

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(Whereupon, the working group meeting was

9

adjourned at 3:15 p.m.)

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CERTIFICATE OF COURT REPORTER**STATE OF GEORGIA****COUNTY OF FULTON**

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of May 18, 2006; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 19th day of July, 2006.

STEVEN RAY GREEN, CCR**CERTIFIED MERIT COURT REPORTER****CERTIFICATE NUMBER: A-2102**