

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

ROCKY FLATS

The verbatim transcript of the Working
Group Meeting of the Advisory Board on Radiation and
Worker Health held in Hebron, Kentucky on January
26, 2007.

C O N T E N T S
January 26, 2007

WELCOME AND OPENING COMMENTS DR. LEWIS WADE, DFO	6
COMPLETENESS OF DATA	18
1969 DATA GAP	71
COWORKER MODELS	119
OTHER RADIONUCLIDES - THORIUM	142
LOG BOOK ANALYSIS AND DATA INTEGRITY	195
SAFETY REPORTS	195
SUPER S (TIB 49)	241
NEUTRON ITEMS	254
D AND D (TIB 0014)	259
MATRIX UPDATE	261
COURT REPORTER'S CERTIFICATE	274

TRANSCRIPT LEGEND

The following transcript contains quoted material. Such material is reproduced as read or spoken.

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

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

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

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

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

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

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

(By Group, in Alphabetical Order)

BOARD MEMBERSEXECUTIVE SECRETARY

WADE, Lewis, Ph.D.

Senior Science Advisor

National Institute for Occupational Safety and Health

Centers for Disease Control and Prevention

Washington, DC

MEMBERSHIP

GIBSON, Michael H.

President

Paper, Allied-Industrial, Chemical, and Energy Union

Local 5-4200

Miamisburg, Ohio

GRIFFON, Mark A.

President

Creative Pollution Solutions, Inc.

Salem, New Hampshire

MUNN, Wanda I.

Senior Nuclear Engineer (Retired)

Richland, Washington

PRESLEY, Robert W.

Special Projects Engineer

BWXT Y12 National Security Complex

Clinton, Tennessee

IDENTIFIED PARTICIPANTS

ALBERG, JEANETTE, SEN. ALLARD
BARKER, KAY, ANWAG
BARRIE, TERRY, ANWAG
BOLLER, CAROLYN, CONG. UDALL
BRACKETT, LIZ, ORAU
BROEHM, JASON, CDC WASHINGTON
BUCHANAN, RON, SC&A
CHANG, CHIA-CHIA, NIOSH
DEMAIORI, TONY, PETITIONER
ELLIOTT, LARRY, NIOSH
ESCOBAR, FELICIA, SEN. SALAZAR
FITZGERALD, JOE, SC&A
HOFF, JENNIFER, ORAU
HOMOKI-TITUS, LIZ, HHS
HOWELL, EMILY, HHS
JESSEN, KARIN, ORAUT
KOTSCH, JEFF, DOL
LABONE, TOM, ORAU
LITTLE, CRAIG, ORAU
LOPEZ, TERESA, ORAU
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
MEYER, BOB, ORAU
NETON, JIM, NIOSH
RICH, BRYCE, ORAU
ROBERTSON-DEMERS, KATHY, SC&A
SHARFI, MUTTY, ORAU
SMITH, MATTHEW, ORAU
THOMAS, ELYSE, ORAU
ULSH, BRANT, NIOSH

P R O C E E D I N G S

(10:00 a.m.)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22WELCOME AND OPENING COMMENTSDR. LEWIS WADE, DFO

DR. WADE: (by Telephone): Ray, are you up and running?

COURT REPORTER: Yes, sir, ready.

DR. WADE: (by Telephone): What this is is a meeting of the work group on Rocky Flats site profile and SEC petition activities that functions under the Advisory Board on Radiation and Worker Health. The group is most ably chaired by Mark Griffon, members Gibson, Presley and Munn. Also, the materials we've been providing, the principal NIOSH contact is identified as Brant Ulsh, and the principal SC&A contact identified as Joe Fitzgerald.

Just for a little bit of background, the full Board at its last meeting decided that it stated its intentions to take up the Rocky Flats' petition at its meeting in May, May 2, 3 and 4, later this year. It did that

1 because of input it has had from petitioners
2 and members of Congress and others as to the
3 need to do a complete job in terms of the
4 science issues that were remaining. So that's
5 the target for the Board, taking up the
6 petition in earnest May, 2, 3 and 4. Our
7 intention would be to do that in Denver,
8 Colorado.

9 Again, this is Lew Wade. I have the
10 privilege of serving as the Designated Federal
11 Official for the Advisory Board. I apologize
12 for not being there. This is the first
13 meeting of any type that I've not been able to
14 be there face to face. So I'll do my
15 introductions, and I'll be on the phone with
16 you until noon.

17 And then ably Chia-Chia Chang is
18 there, and Emily Howell is there, and they'll
19 serve the role as Designated Federal Official
20 as well as representing the Office of General
21 Counsel. To them I'll say I'll have my cell
22 with me and would be available on cell if you
23 were to need me at any time during the course
24 of the meeting.

25 I first would like to establish what

1 Board members are involved and present on the
2 call. Mark, I assume you're there. I've
3 heard Wanda. I've heard Robert. Is Mike
4 Gibson there as well?

5 **MR. GIBSON (by Telephone):** I'm via phone
6 call.

7 **DR. WADE (by Telephone):** Okay, are there
8 any other Board members that are either in the
9 room that I didn't identify or on the phone?

10 (no response)

11 **DR. WADE (by Telephone):** So my hearing is
12 that we have Mark, Wanda, Robert and Mike
13 participating. We don't have a quorum, and
14 therefore, we can proceed.

15 One quick news update, as many of you
16 know, two new Board members have been
17 identified, and it's looking very likely that
18 they would be seated at the table for our
19 February meeting. It's not completely done
20 yet, but it's certainly looking that way. And
21 that's good news for all of us, particularly
22 the overworked Board members who they'll be
23 joining.

24 One quick thing on phone etiquette, if
25 you are participating by phone, please mute

1 when you're not talking. If you are talking
2 use a handset. Realize that background noises
3 of all types enter into the room and can
4 distract the participants. And also, if you
5 have a system where when you go on hold or go
6 away for awhile and background music plays,
7 please be aware of that and don't do that to
8 the working group. It happens more frequently
9 than we would like.

10 One other caution is with regard to
11 the discussion of Privacy Act related
12 information. This working group and those
13 that support it have done a wonderful job of
14 getting their documents in and cleared, and I
15 think we have cleared documents available for
16 anybody who would want them. But since this
17 work group has in some of its deliberations
18 got to look at individual records, I would
19 just caution all of us in our discussions to
20 be sure that we don't get into anything that
21 would contain personal identifiers or allow an
22 individual to be identified. I think the
23 documents are good. Just exercise a little
24 discipline in your verbal comments as well,
25 realizing that protecting everyone's privacy

1 is terribly important to all of us.

2 I guess with that I would suggest that
3 we go around the table and do our
4 introductions. Please for ORAU/NIOSH team
5 members and SC&A team members, when you make
6 your introductions, please identify any
7 conflicts you have with regard to this site.
8 So I would start in the room from Mark's
9 right.

10 **MS. MUNN:** This is Wanda Munn. I have no
11 conflicts with Rocky Flats.

12 **MR. DeMAIORI:** Tony DeMaiori, petitioner.

13 **DR. NETON:** This is Jim Neton, NIOSH, I have
14 no conflict at Rocky Flats.

15 **MR. PRESLEY:** Robert Presley, Board member,
16 I have no conflicts with Rocky.

17 **MR. SHARFI:** Mutty Sharfi, ORAU team, no
18 conflicts Rocky Flats.

19 **MS. CHANG:** Chia-Chia Chang, NIOSH, no
20 conflicts.

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

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

25 **MS. JESSEN:** Karin Jessen, ORAU team, no

1 personal conflicts.

2 **MS. HOFF:** Jennifer Hoff, ORAU team, no
3 personal conflicts.

4 **DR. ULSH:** Brant Ulsh with NIOSH, no
5 conflicts.

6 **MR. LITTLE:** Craig Little, ORAU team, no
7 conflicts.

8 **MR. MEYER:** Bob Meyer, ORAU team, no
9 conflicts.

10 **MR. RICH:** Bryce Rich, O-R-A-U team, have
11 two year administrative oversight conflicts.

12 **MR. ELLIOTT:** Hello, this is Larry Elliott,
13 no conflicts.

14 **MS. HOWELL:** Emily Howell, HHS, no
15 conflicts.

16 **MR. GRIFFON:** And Mark Griffon with the
17 Advisory Board, no conflicts.

18 And Lew, we'll go back to the phone
19 people.

20 **DR. WADE (by Telephone):** If there's any
21 NIOSH/ORAU team or SC&A team members on the
22 line, please identify yourself.

23 **MR. SMITH (by Telephone):** Yeah, this is
24 Matthew Smith, ORAU team, no conflicts.

25 **MS. BRACKETT (by Telephone):** Liz Brackett,

1 O-R-A-U team, no conflicts.

2 **DR. WADE (by Telephone):** SC&A?

3 **DR. MAURO (by Telephone):** John Mauro, SC&A,
4 no conflicts.

5 **MR. BUCHANAN (by Telephone):** This is Ron
6 Buchanan, SC&A, no conflicts.

7 **MS. LOPEZ (by Telephone):** Teresa Lopez,
8 ORAU team, no conflicts.

9 **DR. WADE (by Telephone):** Any other team
10 members, SC&A, ORAU/NIOSH?

11 **MR. LaBONE (by Telephone):** I'm sorry, this
12 is Tom LaBone, O-R-A-U team, no conflicts.

13 **MS. DeMERS (by Telephone):** This is Kathy
14 Robertson-DeMers, SC&A, no conflicts.

15 **MS. THOMAS (by Telephone):** This is Elyse
16 Thomas, O-R-A-U team, no personal conflicts.

17 **DR. WADE (by Telephone):** Anyone else?

18 **MR. GIBSON (by Telephone):** Lew, this is
19 Mike down at the complex.

20 **DR. WADE (by Telephone):** Welcome.

21 Any other federal employees who are on
22 the line by virtue of their federal
23 employment?

24 **MS. BOLLER (by Telephone):** This is Carolyn
25 Boller with Congressman Mark Udall's office.

1 **DR. WADE (by Telephone):** Welcome.

2 **MS. ALBERG (by Telephone):** And Jeanette
3 Alberg with Senator Allard's office.

4 **DR. WADE (by Telephone):** Welcome.

5 **MS. ESCOBAR:** And this is Felicia Escobar
6 with Senator Ken Salazar's office.

7 **DR. WADE (by Telephone):** Welcome all.

8 **MS. HOMOKI-TITUS (by Telephone):** Liz
9 Homoki-Titus with Health and Human Services,
10 and I have no conflicts.

11 **DR. WADE (by Telephone):** Jeff?

12 **MR. KOTSCH (by Telephone):** Jeff Kotsch with
13 Department of Labor.

14 **MR. BROEHM (by Telephone):** Jason Broehm,
15 CDC Washington Office, no conflicts.

16 **DR. WADE (by Telephone):** Anyone else who
17 would like to be identified, petitioners,
18 representatives, workers at the site? Anyone
19 else who would like to be identified for the
20 record?

21 **MS. BARRIE:** Terry Barrie with ANWAG.

22 **DR. WADE (by Telephone):** Thank you for
23 being with us, Terry.

24 **MS. BARRIE:** Kay Barker will be on the line
25 later.

1 **DR. WADE (by Telephone):** She's more than
2 welcome.

3 Okay, Mark, I think it's all yours.

4 **MR. GRIFFON:** Before we start I think Emily
5 wanted to take the floor for a second.

6 **MS. HOWELL:** I just wanted to kind of
7 reiterate what Lew was saying a minute ago
8 about Privacy Act protected information. I
9 think that we work really hard to try and
10 review all of the documents for these
11 meetings, but this working group has in its
12 quest to really delve into information has
13 gone to the level of looking at individual
14 files.

15 And I think that there's some older
16 versions of the matrix that are out there
17 floating around that may include some
18 protected information. As members of the
19 working group or our contractors you're able
20 to have those.

21 But please just be aware that you may
22 have a version if it was, if you printed it or
23 received it prior to yesterday afternoon then
24 the version you have probably does have
25 protected information in it, and I think that

1 Brant has some redacted matrices if you would
2 like a new copy. So please just be aware of
3 that if you go to speak off of the matrix.

4 If there's a name in it, and it's not
5 someone who's sitting around this table as an
6 OCAS, ORAU or SC&A employee, you probably
7 should not be saying that name. And if you
8 ever have any questions, you're more than, I'm
9 more than willing to take any questions at any
10 time.

11 **MR. GRIFFON:** I think we've been, I mean I
12 think we can work with that with the work
13 group here today. The only person I have, I
14 think the prior matrices have been made public
15 in the Board meetings so they're out there,
16 not just internally circulated within the work
17 group.

18 **MS. HOWELL:** Right, and like I said, this is
19 kind of a continuing area of concern, and
20 we're trying to work on this, but there may be
21 other matrices that include information that
22 we would have liked redacted that are still
23 out in the public so we're just trying to get
24 better from here on out.

25 **DR. MAKHIJANI:** Could I ask a question?

1 **MS. HOWELL:** And if you do have copies of
2 the old matrices that have the Privacy Act
3 protected information in them or if you're not
4 sure, if you could discard them and do so in a
5 careful manner, that would be helpful.

6 Arjun?

7 **DR. MAKHIJANI:** Yeah, could I ask a question
8 about that? Now there is one individual I
9 know who NIOSH asked for Privacy Act release,
10 and he did sign an appropriate form --

11 **MS. HOWELL:** Okay, I would prefer you talk
12 about that off line with me. Without having
13 it in front of me I can't be sure, and any
14 time we get into these discussions around the
15 table, we could be making the problem worse.
16 So we can talk about that during the break.

17 **DR. MAKHIJANI:** All right.

18 **MR. GRIFFON:** I don't think this in any way
19 affects what we have to discuss here in this
20 meeting, but we should all understand the
21 rules so let's just, we can work from the
22 redacted version of the matrix today.

23 Actually, I have an abbreviated agenda
24 which we've been using for most of the last
25 two or three work group meetings. And then

1 I'd like to use that same sort of format,
2 cover the main action items of interest and
3 then go back through this redacted matrix
4 toward the end of this meeting and make sure
5 we've captured everything and sort of update
6 ourselves.

7 The agenda I'd propose, and partly
8 this was to frontload the items I thought were
9 the most pressing and also to allow some SC&A
10 personnel to be online when they need to be
11 and not necessarily for the whole day and the
12 same goes for some ORAU people maybe.

13 I'd like to start off with number one,
14 data completeness; number two, the '69 data
15 question; number three is the coworker models,
16 and that's mainly as they pertain to this
17 question of completeness. Number four is
18 other radionuclides, and I think we're down to
19 thorium as our other radionuclide outstanding
20 action here. Number five is log book
21 analysis; six is the safety report analysis.
22 Seven is the Super S item; eight is neutron
23 issues, and nine is D and D worker questions.

24 So if that's okay with everyone, I'll
25 think we'll stick to that. I tried to, like I

1 said, frontload some of the more, items I
2 thought were going to take a little longer and
3 were maybe more pressing. Any comments on
4 that; otherwise we'll proceed.

5 COMPLETENESS OF DATA

6 All right, let's start off with the
7 data completeness. I think where we stand on
8 this is that SC&A provided a report, and did
9 we get the whole report or were there still
10 pieces that were Privacy Act review or at this
11 point we have the whole section of the report?

12 **MR. FITZGERALD:** Yeah, the whole section of
13 the report has gone through Privacy Act
14 clearance and was distributed on January 10th
15 to the working group. So it's been through
16 all the review.

17 **MR. GRIFFON:** Can I ask NIOSH is that
18 distributed to petitioners and other
19 interested parties? It went through Privacy
20 Act review. I thought we were going to try to
21 get those components out.

22 Lew, do you know if that was made
23 available to the petitioners and other
24 interested --

25 **MS. BARRIE:** Mark, this is Terry Barrie and

1 no, I have not received any reports that have
2 been cleared by the Privacy Act.

3 **DR. WADE (by Telephone):** I guess I would
4 ask, Larry, if you would make a note to see
5 that that's distributed.

6 **MR. ELLIOTT:** Yes, I will.

7 **MR. GRIFFON:** I think we agreed that this
8 was okay, right? These draft sections of the
9 --

10 **DR. WADE (by Telephone):** Yes, once they've
11 been cleared, yes.

12 **MR. GRIFFON:** So I think there's a couple --

13 **MR. ELLIOTT:** I just don't know that I've
14 had approval that they've cleared. Well,
15 we'll check into it.

16 **MR. GRIFFON:** Once we're sure they've been
17 Privacy Act reviewed and cleared, we'll get
18 those distributed as soon as possible, right?

19 **MR. ELLIOTT:** Yes, as soon as I hear that
20 they're approved for distribution, we'll put
21 them on the website and we'll share it with
22 the petitioners and interested external
23 parties.

24 **MR. GRIFFON:** I didn't know that it had to
25 be on the website, but --

1 **DR. MAKHIJANI:** Yeah, what didn't happen is
2 we sent the materials to CDC to Emily, and we
3 got instructions about what to take out that
4 was covered by the Privacy Act, and we did
5 that. And then put together a version that
6 was completely de-identified as per the
7 instructions. And that's what --

8 **MR. FITZGERALD:** That's what on January 10th,
9 at least for this particular section, we
10 transmitted to NIOSH and the work group.
11 That's as far as it went. It went to the work
12 group as well as NIOSH, and with a notation
13 and a cover e-mail that we would assume that
14 NIOSH would handle outside distribution.

15 **MR. GRIFFON:** Okay, that's fine. Larry, you
16 can check on making sure that it's been
17 finally approved for distribution. I think
18 the way, part of the reasoning here is that
19 these are draft sections, final draft sections
20 of SC&A's overall report, and we kind of, the
21 notion was to keep the petitioners and other
22 interested parties informed along the way
23 instead of dropping one big report at the end
24 of --

25 **MR. ELLIOTT:** I understand. I share the

1 interest in making that happen. I can't do it
2 until I hear I'm okay to do it.

3 **MR. GRIFFON:** With that maybe we'll just
4 start, Joe, if I can, I'll give you the floor
5 to give us an overview of what you've put in
6 this report.

7 **MR. FITZGERALD:** On this particular issue we
8 caught in shorthand the completeness issue but
9 again, we're going back to an old issue in a
10 sense because when we reviewed the Rocky
11 Flats' site profile, we did spend quite a bit
12 of time focusing on concerns, certainly
13 concerns expressed by the former workers that
14 there were unexplained zeros, perhaps gaps in
15 records, notations, such as no data available.

16 So we certainly raised those questions
17 in the site profile and certainly the
18 petitioners have raised similar issues in the
19 petition. So certainly going into this
20 evaluation we wanted to focus on that from a
21 number of different vantage points. And we
22 spent a great deal of time on the data
23 reliability side looking at whether or not we
24 could corroborate that question by virtue of
25 the log book reviews that we've done, and

1 we'll talk about that later, evaluating quite
2 a few safety concerns that were available and
3 also looking at certain, the affidavits and
4 certain data integrity issues.

5 On this particular issue though we
6 were also concerned about looking at the
7 database as a whole. Looking at whether or
8 not one could look at the database and
9 ascertain how complete in fact it is. We
10 looked at HIS-20, which is the electronic
11 database, first. And in our comparative
12 reviews we certainly began picking up some
13 issues, some discrepancies.

14 It took some time, I think, to get
15 into a level of understanding as to what we
16 were looking at. But over the course, I
17 think, of middle and last, late last year we
18 certainly established that we had a number of
19 issues regarding the completeness of the
20 electronic database, HIS-20.

21 Certainly, at that stage we turned to
22 the, what we would call, the claimant file,
23 the raw data itself that the HIS-20 is based
24 on, certainly wanting to know how complete
25 that is in fact because that would be, in

1 fact, the original data that would be the
2 baseline for doing dose estimations.

3 We did a sampling analysis initially
4 which was basically just doing a limited
5 number of samples, in this case a dozen, just
6 to get some sense of what we were looking at.
7 That sort of reconnaissance survey
8 demonstrated a number of gaps that we were, I
9 think, taken aback by. We didn't expect to
10 see in that kind of a limited sample the kinds
11 of gaps that we did see.

12 That led to our going to this working
13 group, and certainly looking for their
14 guidance which they suggested that we expand
15 that sampling to include what ended up being
16 40 more cases from the original raw data file.
17 So this is a total now of 52 cases that we
18 were sampling out of the original claimant
19 file. And that sampling plan was designed to
20 be, given the sample size, as representative
21 as we could be.

22 And so in any case the analysis that
23 we presented right after New Year's is in
24 essence our report of what that sampling of
25 the 52 cases showed us. And quite frankly,

1 and I'm going to turn to Arjun in a second to
2 walk through the details, the bottom line, it
3 corroborated, I think, our initial concerns on
4 that smaller sample that there are, in fact,
5 are significant gaps in the claimant file upon
6 which your coworker models and other
7 estimations would be based.

8 So we do have serious concerns over
9 whether or not this database is going to be
10 sufficiently complete to do coworker modeling
11 and to do the necessarily gap filling that one
12 has to do when you have unmonitored workers.
13 So with sort of a prelude and background I
14 think what we want to do is really walk this
15 work group and this group carefully through
16 this report. I think this report's a very,
17 very critical report on this whole question of
18 completeness. And I think coupled with what
19 we did on data reliability, I think does
20 tackle what I think is the cornerstone of this
21 review.

22 **MR. GRIFFON:** Excuse me. If you're on the
23 line, could you mute your phone? We're
24 hearing some people talking so you might want
25 to mute your phones, please.

1 **DR. MAKHIJANI:** Thanks, Joe. Basically the
2 frame work of the review was provided by the
3 Board's criteria on the pedigree of the data
4 and the methodology and internal consistency,
5 and also the Board's approval of our interim
6 SEC review procedures which require us to
7 review completeness of data.

8 As Joe said, we reviewed two different
9 kinds of samples from the data. One was a set
10 of 32 developed over time which were random
11 samples divided into two periods, the early
12 period when there wasn't universal monitoring
13 which goes up to '63, and then from '64 when
14 the ID badge was an integrated badge with the
15 dosimeter and the identification in a single
16 badge.

17 Now we understood later on that
18 subcontractor workers were not covered by the
19 universal monitoring policy, but the jump in
20 the percentage of monitored people in '64,
21 percentage of people wearing badges, that
22 indicates that the percentage of people badged
23 were in the 90 percents except for 1969
24 through about 1990. So this analysis goes up
25 to 1992.

1 Nineteen ninety-two is a little bit
2 anomalous here because that production stopped
3 early in that year, so they went through the
4 transition year to go into a decommissioning
5 mode which was formally declared in 1993. So
6 I'll walk you through our findings.

7 We divided this into external dose and
8 internal dose findings, and we also just as a
9 caveat on what kind of completeness review
10 this is. This wasn't a detailed completeness
11 review where the whole record was examined for
12 every gap. This was a broad screen review
13 where we said the data had a gap, when there
14 was no record for that year at all. If there
15 was one zero reported, for instance, we did
16 not count that as a gap.

17 So it doesn't mean that the record is
18 complete or there's a record for every badge
19 cycle. So it's a very broad screen that
20 allowed us to go relatively efficiently to
21 determine whether the gaps were large or not.
22 And the use of the broad screen means,
23 especially for external dose, that this is a
24 minimal estimate of the completeness of the
25 data.

1 So in the first table where we did the
2 external dose analysis we found that for the
3 early period we defined two kinds of data
4 gaps. One was the proportion of workers who
5 had a gap for one year or more. And then we
6 defined a cumulative gap which is if you add
7 up all the years for all 32 workers that were
8 in each period and how many percent of those
9 years were not monitored cumulatively.

10 So just to run you through the numbers
11 for external dose in the '51 through '63
12 period. There were 14 workers in the sample
13 and 29 percent of them had gaps of one year or
14 more. And the cumulative gap was 21 percent,
15 that is, of all, we multiplied the 14 workers
16 by the 13 years. Twenty-one percent of those
17 years were blanks.

18 Then '64 to '92 there were 30 workers
19 in the sample, and the percentage of workers
20 with gaps of one year or more were 33 percent.
21 Now there's a statistical artifact in that by
22 the way we defined the period because of the
23 1992 transition year. Of the ten workers who
24 had a gap of one year or more, four workers
25 were in that, had a gap only for 1992. So if

1 you exclude 1992, and we included it because
2 that was the instruction of the working group
3 and that's how it was decided here, but if you
4 exclude 1992, the gap goes down to about 20
5 percent.

6 And the cumulative gap for 30 workers
7 multiplied by the number of years, '64 to '92,
8 29 years, is ten percent. So gap is smaller
9 for the second period which is what we would
10 expect since there was this quasi-universal
11 badging.

12 Now in these numbers we did not
13 include 1969 which is separate. Nineteen
14 sixty-nine had partial or full gaps and so we
15 have to, we just analyzed that separately, and
16 it's a separate action item on the working
17 group. And so these numbers don't reflect
18 1969. And it's also important to remember
19 that these are gaps in the record, not zeros.
20 So zero entries are counted as positive
21 indications of recorded data.

22 Then we looked at internal dose and
23 the same data for the same set of workers, and
24 for the '51 to '63 period number of workers
25 with a gap of one year or more was about the

1 same, 29 percent. Now for internal dose we
2 defined the gap when there was no measurement
3 of any kind, either urinalysis or fecal
4 samples or an in vivo count. So if there was
5 one count of any of these types we counted as
6 a year that had a measurement, and it was not
7 a gap. So no internal dose measurement for
8 the full year of any kind counts as a gap. So
9 again, it's a very broad screening.

10 The cumulative gap for the early
11 period was 12 percent of all the workers, 14
12 workers, multiplied by 13 years. Twelve
13 percent of those years were unmonitored
14 cumulatively.

15 One surprising finding was in the
16 second period we found that 73 percent of the
17 workers had a gap of one year or more, and the
18 cumulative gap was 33 percent. So this, of
19 course, raises the question of how the gaps
20 are going to be filled. The reason to look at
21 the highly exposed workers was to examine the
22 question of whether the gaps can be filled and
23 what questions it raises for coworker models.

24 The highly exposed workers,
25 quote/unquote, were defined by Rocky Flats

1 review, retrospective review that was
2 undertaken in the 1990s. They had a set of, I
3 don't remember how many workers they reviewed,
4 but they had a set of workers that they
5 reviewed for cumulative exposure where the
6 internal and external was added up. And then
7 they classified workers from one to four into
8 exposure categories.

9 And category four was the most exposed
10 cumulative dose. Category three was the less
11 below that, and category one had the least
12 cumulative exposure. Now this doesn't
13 separate internal and external dose, and it
14 doesn't separate periods. So if somebody who
15 had a high cumulative may not have been in the
16 highest exposed category at some period.

17 But it was an approximate guide to
18 examining whether there were data available
19 for filling in the gaps. It's not definitive
20 but indicative. What we found was, we again
21 did separation of external and internal dose.
22 We did not find any full year gaps in the
23 internal dose for the highly exposed workers.
24 We had ten cases from category four and ten
25 cases from category three. And all of them

1 had at least one measurement.

2 Now it doesn't say it's complete in
3 all respects but there was in this broad
4 screening no gap in the internal dose
5 measurements. Now we don't include a screen
6 as to whether every relevant radionuclide was
7 monitored and so on. But every one of these
8 20 workers had at least one measurement during
9 each year.

10 For external dose we did find some
11 gaps -- there's no table here so I'm trying to
12 find the number. Excuse me. But the most
13 significant gap we found was in group three
14 workers, that is, in the workers just below
15 the highest exposed workers in the '51 to '59
16 period. So it turned out in the early period
17 there were external dose gaps.

18 And if you looked at a part of that
19 early period, '51 to '59, the gaps were
20 particularly large. Sixty-two percent of the
21 cumulative employment years in group three
22 workers were missing -- I shouldn't say
23 missing -- had blanks in their external dose
24 records which indicate that maybe they were
25 not badged in that period.

1 Now this was a period of partial
2 badging of workers. In the earliest period
3 there were the fewest workers badged and that
4 proportion of badging went up as the '50s went
5 on. And then in the '60s we did not find
6 external dose gaps.

7 We looked at the job descriptions of
8 the workers, the job cards of the workers who
9 had these external dose gaps and the group
10 four workers in order to determine whether
11 there was any pattern in their job assignments
12 for why they may have been badged or not
13 badged.

14 Most of the full year gaps were
15 associated with work in Production Plant B
16 where depleted uranium and enriched uranium
17 was processed. So as NIOSH has said that the
18 uranium areas were the areas that were thought
19 to have low exposures. So there was a
20 systematic decision, at least the sampling
21 indicates that there was a systematic decision
22 that workers in plutonium areas would be
23 badged and workers in uranium areas were. I
24 don't know if they were all done that, but the
25 gaps are focused in those areas.

1 There were some gaps in Building 81,
2 the QC Lab, something called the Pipe Shop.
3 There were no full year gaps for people who
4 worked in Production Plant C which were the
5 plutonium workers. So that's important to
6 say. So there's a clear division in how these
7 gaps emerged.

8 Now we looked at documents indicating
9 exposure potential in the uranium areas and in
10 a particular uranium area, the foundry
11 operations, the foundry operations result --
12 let me go back. Uranium as a homogeneous
13 material builds up its first decay products to
14 equilibrium relatively rapidly, thorium-234
15 and protactinium-234. And its external
16 contact dose, shallow dose and deep dose, are
17 relatively well-known to be maximum two milli-
18 rad for hour for deep dose and about 240 for
19 shallow dose.

20 But if, in foundry operations, there's
21 a separation of the decay products, and the
22 shallow beta dose rates can be pretty high,
23 this is documented in an evaluation of the
24 uranium areas. The depleted uranium castings
25 where in the early years there were shallow

1 dose rates as high as 2,000 to 3,000 milli-
2 rads per hour, so in order of magnitude bigger
3 than the homogeneous uranium metal contact
4 dose that were documented.

5 These were thought to be very high or
6 extremely high and the problem persisted
7 though apparently in lesser degree through
8 1982 when the report was written. I think
9 either this report or the 1969 report actually
10 contains the extended quotation from the year
11 1982 report documenting that.

12 Now we have external dose data for the
13 plutonium areas, and the question arises
14 plutonium also itself does not have,
15 plutonium-239, does not have a strong shallow
16 dose component or deep dose component. There
17 is americium-241 in the plutonium areas that
18 provides the main shallow dose component, I
19 mean deep dose component.

20 And the question arises from this
21 analysis is how do the plutonium -- well,
22 there are two questions. How do the external
23 doses in the plutonium areas, especially in
24 the 1950s, correspond to the external doses in
25 the uranium areas especially for shallow dose

1 and would they be bounding? And that's a
2 question we could not answer from our
3 analysis.

4 And then secondly, from among the
5 monitored workers in uranium, was there
6 monitoring from the areas that had the higher
7 exposure potential so you could possibly
8 construct a coworker model? And that also we
9 could not tell from this analysis. So that's
10 the main, other than 1969, which is separately
11 covered, that's the main issue which emerged
12 from the completeness evaluation.

13 There are two other issues, one I've
14 already mentioned in regard to subcontractors.
15 We did not find any evidence of any systematic
16 avoidance, that subcontractors were sent into
17 radiological areas and without badges, and
18 then they were exposed in some nefarious way.
19 We did not find any evidence that there was a
20 systemic violation of the policy that would
21 have resulted in unbadged subcontractor
22 workers going into radiological areas.

23 But we thought that some verification
24 of enforcement would be desirable since there
25 were unbadged subcontractor workers on site

1 apparently throughout the period. And one
2 possible verification that might settle the
3 question which is at the present time sort of
4 an expert statement which is somewhat in
5 opposition to the statement that has been made
6 by the petitioners is that the blanks in the
7 records correspond to a systemic problem. For
8 this particular problem one verification
9 procedure might relate to the clean up of the
10 fires after 1965 or 1969 to see if there were
11 any subcontractor workers that might have been
12 sent into radiological areas but had no badge
13 records.

14 The other issue that has arisen in the
15 context of working groups discussions was
16 that, on the completeness investigations was
17 that of one particular individual who had, who
18 was not a subcontractor worker, who was a
19 prime contractor employee who had an eleven-
20 year exposure data gap from 1963 to 1973
21 inclusive, and only one of those years was a
22 year of when universal badging was not in
23 place.

24 Now this worker is thought not to have
25 a high exposure potential, but ten of those

1 years do relate to a universal badging period.
2 And the question arises, especially when we
3 discuss the 1969 gaps. Maybe you want to
4 defer that question to 1969. What was the
5 policy of badging for prime contractor
6 workers? Or were badges issued and not read
7 from 1964 onward in some way and what happened
8 to those records. So that's kind of an open
9 question that also arose from this
10 investigation.

11 Sorry it took so long to present, but
12 it was pretty complex.

13 **MR. GRIFFON:** That's okay. I just have one
14 follow-up on the production workers. You
15 said, I heard the external group three workers
16 you found some gaps in the '50s. I think you
17 said no gaps from '64 through '92 for the
18 production workers?

19 **DR. MAKHIJANI:** Yeah. From, I believe if I
20 remember all the details correctly, from '61
21 onward.

22 **MR. GRIFFON:** So it was mainly that '52
23 through '59.

24 **DR. MAKHIJANI:** Yes, '51, yeah.

25 **MR. GRIFFON:** And I know that at this point

1 I guess we don't need to cover '69 yet, but I
2 know at this point NIOSH has this report, and
3 they're reviewing it and going through it. I
4 know that, and talking to Brant I know you're
5 not in a position to give a full response. I
6 guess the only question I had was this, you
7 know, just in terms of when we do get your
8 response to this I still have this question of
9 what are we measuring against? And I don't
10 know if you made any headway in resolving this
11 question of, remember the '69 memo where this
12 policy apparently was put in place for not
13 reading some of the badges from people that
14 were wearing badges. But we never really
15 understood if it was one year, if it
16 continued, and I know you said you were going
17 to look into that. I don't know if you've got
18 any update on that, but I think it would be
19 nice for us to know. The better we understand
20 the policies over time, the better we can
21 understand the results here, you know, if
22 they, if there's anything to these results or
23 if they are well explained by policies that
24 were in place at the time.

25 **DR. ULSH:** Well, you raise a good point

1 there, Mark. We've got to keep in mind the
2 overall purpose of this analysis. I think
3 SC&A's report gets us partway there in terms
4 of how many years -- well, no, what time
5 periods do you see where individual workers
6 did not, there's no monitoring results in
7 their record.

8 But the other part of the question is
9 would you expect there to be records there.
10 And I don't think that we have that answer
11 yet. That's what we are doing. We have,
12 we've had some discussions with SC&A on this.
13 They've interviewed some of the site experts,
14 and what we've suggested was -- and Arjun
15 talked about this -- was that you have to look
16 at the worker's job exposure history card to
17 determine whether or not you would expect them
18 to be monitored. And that's what we're doing
19 in our analysis now.

20 I can tell you that we are seeing a
21 lot of instances where, for the periods where
22 there is no monitoring, that's exactly what we
23 would expect given the worker's job duties at
24 the time. I'm not in a position to tell you
25 that that is the case in everyone because

1 we're not done yet. But we are seeing, again,
2 just like in the first 12, that the workers'
3 job duties do explain at least some of these
4 periods when there are no records for them.

5 And, of course, as you mentioned,
6 there are a couple of questions that this goes
7 to. One is data integrity. I mean, do you
8 have people who should have been monitored
9 according to the badging policies in place at
10 the time, and there's no records, in which
11 case you might conclude that those records are
12 missing. The other question which is number
13 three on your agenda is what effect might that
14 have on the coworker data. And I'll save that
15 discussion for maybe that topic.

16 Now in terms of the '51 to '59 period,
17 so you've got to keep this separate from the
18 '69 issue as Arjun mentioned, you know, that's
19 handled separately. But '51 to '59 I think
20 it's fair to say, Arjun, that we found, I
21 think your report said that you found gaps in
22 the Plant B workers, Building 81 more so than
23 others, not exclusively, but there were more
24 there.

25 **DR. MAKHIJANI:** Yeah, I think you can say

1 that there were not gaps in Plant B workers
2 for full years, and then the gaps that were
3 there were concentrated in the Plant B area.

4 **DR. ULSH:** Right, and this was an issue that
5 when you interviewed Roger that Roger brought
6 up, that people in Plant B, Building 881, were
7 not monitored in the '50s up until I believe
8 it's the fourth quarter of 1960. So we are
9 aware of that. And the badging policy that
10 was in place at the time, I believe, was that
11 people who were expected to get less than ten
12 percent of the tolerance weren't required to
13 be badged. And so that was why those people,
14 that was the thinking about why those people
15 wouldn't have been badged.

16 Now you have raised the concern in
17 your report, but what about people in the
18 foundry? I mean, they could get some pretty
19 high doses, especially if they're coming into
20 contact with the castings or the sculls from
21 the foundry. I would point out to you,
22 however, that the foundry is not in Plant B.
23 The foundry is in Plant A.

24 **DR. MAKHIJANI:** Building 444.

25 **DR. ULSH:** Four forty-four.

1 **DR. MAKHIJANI:** That's why I said the gaps
2 are, the way I characterized the gaps is that
3 the gaps are not in Production Area C. They
4 are in other areas. Right, we caught a lot of
5 gaps in Plant B.

6 **DR. ULSH:** Now Area C, I think, is the
7 plutonium area, right?

8 **DR. MAKHIJANI:** That's right.

9 **DR. ULSH:** So you've got, in the early years
10 you've got A, B, C and D. Plant A is Building
11 444. That's where the foundry was. That's
12 where you might see some of these high doses,
13 like you said in your report. Plant B where
14 you're seeing a lot more of the gaps is
15 Building 881. It's not the foundry.

16 **MR. GRIFFON:** Is it your understanding, or
17 Roger's understanding that those foundry
18 workers should have been -- you know, based on
19 the ten percent?

20 **DR. ULSH:** We're looking at that right now.
21 I think, the indications that we have so far
22 are that their doses were low, but, Mark, that
23 may not be my final word on this. We're
24 looking at it right now.

25 **MR. PRESLEY:** Brant, it's Bob Presley,

1 question. Those early years in that building.
2 Those production years are those years that
3 Rocky was going in there and fabbing the
4 buildings and fabbing the process equipment
5 and things like that.

6 **DR. ULSH:** Bob, I can tell you Building 881
7 was built in 1952, I believe, maybe '53,
8 something like that. I can't tell you when it
9 actually came on line and became hot.

10 **MR. PRESLEY:** Then that may be one reason
11 you've got gaps in those things.

12 **DR. ULSH:** Could be, I'm not in a position
13 to say that that's it.

14 **MR. PRESLEY:** But I mean that's a
15 possibility that those people were not
16 production workers, but they were construction
17 workers, and that building wasn't hot, thus,
18 they weren't monitored. And that was a
19 practice that we did from day one throughout
20 the complex.

21 **DR. ULSH:** That is true, Bob, and that's why
22 we're looking at the job exposure histories to
23 come at it from that question. So I mean, to
24 get at would you expect there to be monitoring
25 here and we don't have any. That would say to

1 you that there might be a data integrity issue
2 here. There should be monitoring results.
3 People should have been monitored, and they're
4 not. We're not in a position to offer an
5 opinion on that just yet for all of the
6 workers and say that some of them --

7 **MR. GRIFFON:** Again, to me it's, I think
8 it's much more useful to see as best you can,
9 and I know you found some of this pieces of
10 this, but the policies of the time, you know,
11 the written policies, indication that here's
12 how we made this decision. Here's who was
13 badged.

14 I mean, I think you need to look at
15 both, but you can look at these jobs, and you
16 probably have a lot that are clear-cut one
17 way; a lot that are clear-cut the other way.
18 And then you've got some of these murky ones.
19 But if you have a policy then we have a
20 brighter line to test, so as best we can find
21 some of those things, that'd be helpful.

22 **DR. ULSH:** I agree with you, Mark, and after
23 our last working -- well, after one of our
24 previous working group meetings when we
25 discussed the first 12, and there was some

1 confusion about what the badging policy was,
2 Jim Langsted put together a write-up on the
3 badging policies. The date on the copy I have
4 here is December 6th. I don't know exactly
5 what date that was sent out, but that has been
6 sent out.

7 **MR. GRIFFON:** I'm sure we got that, yeah.

8 **DR. ULSH:** So you're right, that's the other
9 piece of the puzzle in answering that
10 question. But I did want to point out, I
11 mean, going to the second question, what
12 effect might it have on coworker models. You
13 would obviously be concerned about the areas,
14 the operations in the uranium areas where
15 there was a potential for high exposure and
16 the foundry may be one of those places.

17 But again, the foundry is in Plant A,
18 not Plant B. Plant B is where you're seeing a
19 lot of the gaps. So I just wanted to point
20 that out. We still have to go through the
21 individual cases.

22 Arjun, I think there at the end --
23 okay, well, one other thing I wanted to talk
24 about was the group three workers you
25 mentioned, I think, that there were some gaps

1 in the group three workers in the '50s. And
2 again, the group three and four workers were
3 the ones that were identified in the Medical
4 Recall Program as having had the highest
5 exposures onsite as Arjun mentioned.

6 But the other point that you have to
7 consider is when did they become, when did
8 they achieve that status? When did they
9 become highly exposed individuals? So you
10 shouldn't assume just taking one of these
11 group three or group four people if you see a
12 year when they were not monitored in 1953 and
13 say, gosh, this is a highly exposed worker.
14 Why wasn't this guy monitored? He might not
15 have had a big uptake, a big intake incident
16 or a big external exposure incident until much
17 later. I mean, that's a possibility.

18 **MR. GRIFFON:** And a lot of them moved from
19 uranium areas to the plutonium area.

20 **DR. ULSH:** Yes, that is true. So again, you
21 have to look at the job exposure history even
22 for those people as well, and we are doing
23 that.

24 Now in terms of the '69 fire I believe
25 that you brought up a point about were subs

1 possibly going into the building.

2 **DR. MAKHIJANI:** No, no, just to clarify what
3 I said. In regard to subcontractors, we
4 didn't find evidence of systemic violation.
5 What we suggest, and so that would appear to
6 corroborate to some extent the site expert
7 statement that has been made, but there's no
8 documentation of enforcement of that policy
9 because obviously it leaves some room for
10 problems. That you had subcontractor workers;
11 you had a problem onsite; you had a fire; you
12 had an incident, and you had a need for
13 workers and people were sent in without
14 badges. Because there are statements in the
15 petition about those kinds of problems, not
16 directly about subcontractors. And so the
17 suggestion was that some kind of verification
18 of enforcement be made. But if subcontractor
19 workers can be identified who were sent in,
20 for instance, to clean up after the fire that
21 they were actually badged. We haven't made
22 any statement about whether they were or not
23 or whether there are gaps in that area or not.

24 **MR. GRIFFON:** I was just going to ask, and I
25 know you sent out that paper Jim Langsted

1 wrote it on the policies -- maybe refresh my
2 memory. By the time I found it on my hard
3 drive it'll probably be one o'clock. So does
4 it speak to this question of when did this
5 policy of reading, you know, everybody had the
6 security badge with the TLD or film in it, and
7 they didn't read them all and in '69 that
8 started.

9 **DR. ULSH:** You're talking in '69. Let me
10 give you --

11 **MR. GRIFFON:** Well, it started in '69. We
12 saw that in the memo, right? But we're not
13 clear when it, how long that policy was --

14 **DR. ULSH:** That is correct, Mark.

15 **MR. GRIFFON:** Well, how long was that policy
16 in effect or do you know? Okay, that's the
17 question.

18 **DR. ULSH:** I know. This is the question
19 that we've been hoping to come up with an
20 answer for for awhile.

21 The '69, the policy not to read badges
22 of workers who were on quarterly badge
23 exchange cycles in non-plutonium areas, the
24 first indication in the documentation that
25 we've seen of that was in a monthly progress

1 report, I believe, in April of '69. And
2 that's in actually SC&A's report on that. It
3 pulls out the quote. That was the first
4 indication of when it started. We still have
5 not found any indication of when that policy
6 might have been rescinded.

7 Now, one thing that we are checking
8 on, you've also got to remember that the
9 justification for this that was given in a
10 letter -- I don't want to say the name, but --
11 was that the reason they wanted to do that is
12 because these people -- let's define cohort
13 people -- had low exposure potentials, right?
14 And it was a lot of effort involved in reading
15 badges, using densitometers to read the film
16 badges, and it may not be the best use of your
17 resources, something like, it's not a direct
18 quote.

19 In late '70 or maybe it was '71, the
20 site switched to TLDs, and so that same
21 argument may not hold in terms of being a lot
22 of effort that could be better spent
23 elsewhere. Now, we are trying to look and see
24 whether those people that would have been
25 covered by this policy, the non-plutonium

1 areas on quarterly exchange cycles, whether
2 their TLDs were read. We're checking on that.
3 I don't have an answer for you there, but
4 that's a possibility. I don't know.

5 **MR. GRIFFON:** And then the other question,
6 and I don't know if, I've got to admit I
7 forget, I did read it, believe it or not, but
8 I forget what it said. This question I
9 remember in one of the meetings it came up
10 with not only was there this new or this memo
11 that we found about this policy, but there was
12 also another explanation that I thought was
13 given which was that some personnel or some
14 subcontractor -- this gets into the
15 subcontractor question -- some subcontractors
16 did not require any monitoring? Was that
17 brought up as a policy after '64 or any time
18 period? I'm trying to remember. I thought
19 that was brought up as a possible explanation.

20 **MS. MUNN:** We have this one quote that was
21 in a (inaudible), subcontractor (inaudible)
22 not have been issued a dosimeter.

23 **MR. GRIFFON:** What are you reading from?
24 Which document is this?

25 **MS. MUNN:** This is the Rocky Flats Badging

1 (inaudible).

2 **MR. GRIFFON:** So it's SC&A's report?

3 **MS. MUNN:** No, I think it's (inaudible).

4 **MR. GRIFFON:** Can you read that, Wanda?

5 **MS. MUNN:** Yeah. On the badging report that
6 was sent out in December that the statement
7 was, however, subcontractor personnel with low
8 exposure potential may not have been issued a
9 dosimeter, and then it quotes paragraph
10 6.15.1, conditions where general Health
11 physics surveillance was not required: (a) in
12 areas where penetrating radiation levels are
13 not likely to exceed an average of 0.2
14 millirem per hour, comma, outside contractor
15 personnel may be utilized. Film badges will
16 not be provided under these conditions unless
17 on advice of Health physics, badging is
18 desired for assessing a possible criticality
19 exposure, end of quote. Health physics guide
20 for Rocky Flats division compiled by EA
21 (unintelligible), first issued July 1961,
22 reviewed January 1967, re-issued January 1970.
23 Section renumbered 5.1.7.

24 **MR. GRIFFON:** Well, I guess that's the
25 question. If some of these people that we

1 reviewed for completeness fall into that
2 subcontractor category, then they may not have
3 been required according to this policy to --

4 **DR. ULSH:** That's what it appears to
5 indicate.

6 **MR. GRIFFON:** And we don't necessarily know,
7 or Arjun, you don't know whether these
8 individuals were subcontractors or primary
9 contractors based on the records you were
10 looking at, do you?

11 **DR. MAKHIJANI:** No, we didn't go to that
12 depth.

13 **MR. GRIFFON:** So that's where we're headed.
14 I knew that statement came up before.

15 **DR. MAKHIJANI:** Well, actually in the job
16 cards that I reviewed, I didn't see, I mean,
17 they were pretty much production workers in
18 category three and category four so far as I
19 remember, and there may have been exceptions.

20 **MR. GRIFFON:** The broader, the other --

21 **DR. MAKHIJANI:** The other sample? No, we
22 didn't look at that.

23 **MR. GRIFFON:** So that's what we're engaged
24 in right now.

25 **DR. ULSH:** Okay, Mark, so that's where we

1 are with the question of when did this non-
2 badge policy end. We are pursuing that. I
3 don't have an answer. I know it's still an
4 issue of concern.

5 Now in terms, Arjun, I understand your
6 concern about the subs, that it would be nice
7 to have some verification that this policy was
8 actually enforced. And I can't speak to the
9 general issue, but the specific example that
10 you used, the 1969 fire, I can tell you that
11 we spent a lot of time on that '69 fire and
12 some of the interviews I believe that Mel
13 conducted and maybe even some documentation.

14 I can't remember exactly, but right
15 after the fire, the immediate aftermath of the
16 fire, only professional staff were sent in.
17 There were very little number of them. I
18 don't want to give a number because I don't
19 remember exactly what it was. And they were
20 badged. It wasn't subs that went in
21 immediately after the fire to recover the
22 plutonium because there was a concern about
23 criticality. So that's the immediate
24 aftermath.

25 Now, after the plutonium that was

1 involved in the fire was removed from the
2 building then there were a lot of cleanup
3 activities involved. Of course, this is
4 another thing, and we see a couple of times
5 here in SC&A's reports, in the aftermath of
6 the fire, once the plutonium has been removed
7 from the building, and there's no production
8 operations going on, of course, the external
9 exposure potential goes down. You can't
10 assume that the same exposure potential exists
11 as there was in full production. In fact,
12 it's exactly the opposite.

13 **DR. MAKHIJANI:** There shouldn't be a
14 misunderstanding about what the suggestion is.
15 The suggestion is in fact that subcontractors
16 were at high exposure potential or not when
17 they went into radiological areas. The
18 suggestion was simply a response to the
19 statement that was made, I believe in
20 November, that subcontractor workers were
21 badged when they were sent into radiological
22 areas which would fit.

23 If they were sent for cleanup, that
24 would in my definition at least be a
25 radiological area. And they may not have been

1 at risk of external exposure potential, but
2 they may have been at risk of internal
3 exposure potential. If they were not badged
4 and sent into radiological areas, then there
5 would be a kind of systemic, if that were a
6 problem, then there would be some
7 corroboration of what the petitioners have
8 been saying.

9 And so the concern that is being
10 raised is, yes, there's been a statement by
11 NIOSH, and yes, we did not find any evidence
12 that that statement is incorrect. But it
13 stands so far undocumented and uncorroborated,
14 and it would be useful to have a corroboration
15 not of high or low exposure potential, but
16 whether there were subcontractors who were
17 sent into cleanup areas whose records indicate
18 that they were not issued badges.

19 That I think is an important item
20 because it corresponds directly to the
21 concerns that the petitioners have raised.
22 And I think we have tried to address those
23 systematically and this one should be also.
24 Some verification is desirable. That's the
25 statement that we've made.

1 **DR. ULSH:** Okay, Mark, I think that's all
2 I've got on that at the moment.

3 **DR. MAKHIJANI:** Just a comment about the
4 badging policies, I mean, we didn't raise any,
5 I mean, the part of the reason to look at the
6 job cards was to verify the statements that
7 NIOSH has made. And I think broadly we did
8 verify it. We did only a preliminary look at
9 these job cards. It was rather rapid, and it
10 did result in a confirmation that the non-
11 badging and the gaps were in the non-plutonium
12 area. So actually, we did confirm what has
13 been said many times by NIOSH. And so I think
14 that much has been validated.

15 The question about dose reconstruction
16 that it raises is not confined to what the
17 badging policy was and whether it was regarded
18 as reasonable or done in good faith at the
19 time. And we haven't said that it wasn't, and
20 I think in fact what we found that it was. It
21 was done in good faith. People who were
22 thought to be at not high exposure potential
23 were not badged.

24 In retrospect though NIOSH can't use
25 the policies that were in effect then to do

1 dose reconstruction. They have to do dose
2 reconstruction according to today's standards,
3 and that's the question that I think is raised
4 by the gaps in '51 to '59 is are the gaps in
5 the areas that had high exposure potential
6 where there were systemic lack of badging and
7 how are those gaps to be filled by today's
8 dose reconstruction standards.

9 And we're not saying that in this
10 particular case some policy at the time was
11 violated. We didn't find that. On the
12 contrary we found that NIOSH statements were
13 generally correct.

14 **MR. GRIFFON:** And I think we can't go much
15 further with that until we see your findings -
16 -

17 **DR. MAKHIJANI:** Exactly.

18 **MR. GRIFFON:** -- and you do your final
19 analysis on that yet.

20 **MR. ELLIOTT:** Let me just make sure I
21 understand what I hear Arjun saying here that
22 in essence, and this goes back to the
23 verification comment he made, suggestion he
24 made to us. In essence you validated what we
25 have made as our stated position, and you're

1 suggesting that there's a way here to further
2 verify and confirm that validation.

3 **DR. MAKHIJANI:** No, no, you're mixing up two
4 separate issues. One issue was sort of a
5 subsidiary issue for a small proportion of
6 workers who were subcontractors, whether they
7 were sent into radiological areas without
8 badges. And that was just a verification. We
9 found no evidence of that. So that was a
10 verification suggestion for that.

11 **MR. ELLIOTT:** That's exactly what I was
12 referring to.

13 **DR. MAKHIJANI:** Yeah, but that's completely
14 separate from the data gaps for the 1950s --

15 **MR. ELLIOTT:** I understand.

16 **DR. MAKHIJANI:** -- which were a result of
17 policy of who was badged and who was not
18 badged, and we didn't find any evidence that,
19 you know, there was some systematic effort in
20 the '50s to hide doses of highly exposed
21 people so therefore, they were not badged. We
22 found some confirmation that people in
23 plutonium areas were badged, although as I say
24 it's a broad screen what the gap is. And that
25 people in non-plutonium areas were not badged,

1 not all of them, but the non-badging was
2 focused in the non-plutonium areas.

3 **MR. ELLIOTT:** I think I'm saying the same
4 thing.

5 **MR. GRIFFON:** Okay, okay.

6 **DR. MAKHIJANI:** But that latter problem is a
7 coworker model problem, not a verification
8 problem.

9 **MR. GRIFFON:** I guess with respect to the
10 first question, the subcontractor question, I
11 think is there an action there is my question.
12 Is there an action on NIOSH's behalf? We've
13 got a statement by, concerns various other
14 petitioners, and you're saying we've had a
15 response that it was the policy at the time to
16 badge them if they were in the RAD areas, but
17 we have nothing to really support that, and
18 you know, I think the action would be give us
19 some data that supports that. I'm not sure
20 what exactly that would be, but is that sort
21 of what you're raising here?

22 **MR. ELLIOTT:** What I'm hearing is their
23 understanding is no different than ours.
24 They're suggesting a way to verify and confirm
25 that we're both on the same --

1 **MR. GRIFFON:** Right, we haven't seen --

2 **MR. ELLIOTT:** -- it goes to helping out the
3 petitioners understand what we've all done
4 here, and how we're reacting to their --

5 **MR. GRIFFON:** Arjun's saying we haven't
6 found any problems there, but we haven't
7 either seen the verification of that either,
8 right?

9 **DR. ULSH:** Well, what I'm wondering, Arjun,
10 is if -- and I really don't know this -- in
11 the '52 that we're looking at are there subs
12 included in there?

13 **MR. GRIFFON:** That's what I asked.

14 **DR. MAKHIJANI:** I did not look at the job
15 cards for 32 random sample workers so I don't
16 know. I do not believe that from my
17 preliminary review there were subs in the
18 category three and category four workers.

19 **MR. ELLIOTT:** I'm simply saying what I'm
20 taking away from this is that you see things
21 the same as we stated, and you're providing us
22 a constructive suggestion on how to verify
23 what we both have seen.

24 **DR. MAKHIJANI:** Yes, in terms of the reasons
25 for the gaps and in terms of the overall

1 completeness picture apart from how you're
2 going to do dose reconstruction, yes, we have
3 no differences, and we didn't identify that
4 any statement that NIOSH made was incorrect.
5 We're just suggesting one, there is one
6 outstanding question that relates more to the
7 '69 but goes not only forward from '69 but
8 back from '69 is what happened in the case of
9 the types of individuals that have, that were
10 primary contractor employees who have blanks
11 before '69. And that's a separate --

12 **MR. GRIFFON:** We'll hold that.

13 **DR. MAKHIJANI:** Yeah, we'll just hold that.
14 That's the one exception.

15 **MR. GRIFFON:** So that's a question that is a
16 potential action item. It would help, I think
17 you're right, Larry, it would help support
18 that position and verify that to a further
19 extent.

20 **MR. FITZGERALD:** In the context of this step
21 I think more to validate the earlier limited
22 sampling that, in fact, these gaps were there,
23 were real and a larger sample helped answer
24 that question, but I think that's as far as it
25 went, just to, in fact, substantiate that

1 these gaps are, in fact, real. Now as far as
2 the reasoning and interpretation, I think all
3 that needs to follow.

4 **MR. GRIFFON:** And it may be if you look
5 through these 32 job histories, and you find
6 some subcontractors, and it shows that they
7 were, in fact, monitored, that might answer
8 the question. That might give us some
9 evidence to support that position.

10 Now you may look at those 32 and find
11 that none of them were subs, you know? But I
12 don't know if you can easily identify within
13 the claimant files, it may not be so easy to
14 pull out who was a sub without looking -- is
15 that something easy within the database that
16 you can look up individuals and --

17 **DR. ULSH:** It seems to me that it would be
18 fairly easy, Mark, to look at the job exposure
19 history cards if they exist for subs.

20 **DR. NETON:** I believe they do.

21 **DR. ULSH:** Something to check. I mean, this
22 is a way to go in and pick out a case by hand
23 and say there's a card here. Is he a sub?
24 Well, nothing here, next guy. But in terms of
25 like doing a sort on NOCTS or something to

1 pull out subs, I don't think we have a way to
2 easily do that.

3 **MR. ELLIOTT:** Unless they reported their
4 employment as with a specific contractor who
5 was at the site.

6 **DR. NETON:** I think we need to check with
7 Mel. He's done a lot of work on this with
8 252. Rocky Flats was one of the example sites
9 that we used to determine whether
10 subcontractors and Rocky Flats main workers
11 had differences in external dose profiles. In
12 fact, that analysis found no difference, and
13 they went to a large extent to pull out as
14 many records as possible to identify
15 subcontractors. I think we ought to look at
16 that.

17 There were building trades workers,
18 subcontractors, but I think we ought to look
19 at that because a lot of work has been done in
20 that area.

21 **MR. ELLIOTT:** That's true. That didn't
22 occur to me.

23 **MR. GRIFFON:** That may be useful. I guess
24 that might be an action item, but I would also
25 say -- I don't know how to say this. I mean I

1 think we need to control the scope of that,
2 and I think you need to control the scope. It
3 would be good to have some evidence toward
4 that, but I don't think that I would expect
5 you to pull hundreds, you know, if you find a
6 few subcontractor files or randomly find four
7 or five or whatever that seem to support this
8 position, that would be pretty good evidence
9 toward the, you know.

10 **DR. ULSH:** Going forward, Mark, I just want
11 to make sure that I know what the work group
12 is expecting. Are we going to finish up our
13 analysis of the 52 and let you know whether or
14 not subs are included in there and then get a
15 feeling from the Board whether or not that
16 will suffice or is there an action item at
17 this time that you want us to go pick out some
18 subs and --

19 **MR. GRIFFON:** Well, I would say pending your
20 analysis of the 32 if there's no subs in
21 there, I think you should go and find some
22 subs. And I'll let you define some, but I
23 would think keep it a small sample.

24 **MR. ELLIOTT:** And look at this TIB-52.

25 **MR. GRIFFON:** Yeah, and maybe the TIB-52

1 already has done some of that.

2 **MR. ELLIOTT:** I would ask that you put that
3 second, and then if that doesn't produce
4 enough, then you go find some subs to look at.

5 **MR. GRIFFON:** If the work is done already
6 obviously don't spend additional resources,
7 right. But I'm not, well, I don't know. I
8 don't know how the subcontractors work, but if
9 buildings trades are in TIB-52, and these were
10 subcontract maintenance people, it may not, I
11 don't know if it's apples and apples but you
12 can find that out.

13 **DR. NETON:** But we need to at least look at
14 that so we don't duplicate our --

15 **MR. GRIFFON:** Certainly as efficiently as
16 you can. If you've got the work done already,
17 use that, yeah.

18 **MS. MUNN:** And the methods Mel used might be
19 useful, too.

20 **MR. GRIFFON:** Yeah, I guess that's what I
21 would say.

22 And I think we have the '69 data gap
23 coming up, but I've got a request for a short
24 break, maybe ten minute break. We've got some
25 microphone issues, and we'll take a comfort

1 break. So ten minutes, I think we're going to
2 keep the line open if that's okay with
3 everyone. And we'll be off the record now.

4 (Whereupon, a break was taken at 11:14 a.m.
5 and the meeting resumed at 11:29 a.m.)

6 **MR. GRIFFON:** I think we're ready to
7 reconvene here, and I think, unless there's
8 anything else on that first item, I think item
9 two --

10 **DR. MAURO (by Telephone):** Excuse me, Mark,
11 this is John Mauro. Before we leave the
12 subject I just was, Arjun had mentioned during
13 his presentation it sounds like one of the
14 issues is that a group of workers where we're
15 finding gaps, and I think everyone agrees that
16 there are gaps. Are these workers either in
17 the uranium areas or foundry areas where they
18 were not monitored for externals.

19 But I also heard Arjun say that one of
20 the concerns there is that under certain
21 conditions the contact dose is on the order of
22 two-to-three rem per hour when you have this
23 thorium and protactinium sort of surface, and
24 also that there might be, in other words not
25 the standard 240 millirem per hour for contact

1 and two millirem per hour penetrating. I
2 think that two millirem per hour is at one
3 foot.

4 I'd like to hear a little bit about
5 has NIOSH been looking at that particular dose
6 reconstruction challenge. In other words how
7 to deal with workers who may have a gap, not
8 monitored, and may have been involved in
9 handling or working with foundry operations.
10 Is that something that they feel they've got a
11 good handle on and it's tractable? Or do they
12 think there are certain aspects to that aspect
13 of dose reconstruction that they're still
14 struggling with?

15 **MR. GRIFFON:** I think what we heard is it's
16 a little premature for that because they're
17 still looking at the Plant B versus foundry
18 question, but I don't know. Brant might have
19 something to add onto that. I think it's a
20 discussion better saved for the next meeting.
21 If we find that some of the foundry workers
22 were not monitored then that might be a more
23 relevant topic of discussion. I don't know.
24 Brant, do you have anything?

25 **DR. ULSH:** That's exactly right, Mark.

1 That's why I made that distinction,
2 John, between Plant B and the foundry. The
3 gaps, as I understand it, that Arjun saw were
4 more for Plant B workers. I don't want to say
5 only for Plant B workers, but more for Plant
6 B. But that would not include the foundry
7 workers because they were in Plant A.

8 Now the remaining question is were
9 those foundry workers in Plant A monitored or
10 not. And that's what we're going to try to
11 establish as we go through the 52 cases and
12 see whether or not we have some input on that.

13 **DR. MAURO (by Telephone):** Okay, thank you.

14 **DR. MAKHIJANI:** Just from my recollection of
15 the review of the job cards I don't remember a
16 lot of workers in that sample from Plant A.
17 So I don't know whether we might have a small
18 numbers problem in for the 1950s because we
19 weren't initially screening for that, to
20 sample that particular population. And so we
21 might have a small numbers problem there that
22 you'll need to do a more definitive look at
23 that.

24 **DR. ULSH:** Right, that's the first step.
25 The first step as you said, Mark, is to look

1 at these 52. But if we don't find the answers
2 there, we agree, Arjun, that it would
3 certainly be an issue if there are people who
4 were not monitored and had high exposure
5 potential. We just have to look at that and
6 see whether or not those foundry workers were,
7 in fact, monitored.

8 **DR. NETON:** I think this is primarily a skin
9 dose issue that we're talking about here which
10 is a beta-type exposure. So you need to be
11 looking at things like extremity exposures and
12 shallow dose to the skin primarily because
13 these are not two R per hour deep penetrating
14 doses for the most part.

15 **DR. MAURO (by Telephone):** Jim, John again.
16 One of the calculations we have not done is to
17 see, we are aware of the contact dose issue.
18 We weren't quite sure whether or not the two
19 MR per hour at one foot would also be affected
20 by the fact that you have more of the
21 protactinium close to the surface and whether
22 or not that would change anything. I don't
23 have a sense of that.

24 **DR. NETON:** You're going to have a little
25 more (unintelligible) coming off of there, but

1 I think it's primarily a beta dose issue is
2 what these contact doses are. But if that's
3 the case, then it really becomes a skin dose
4 issue which is then not an SEC cancer although
5 it doesn't mean it couldn't be --

6 **MR. GRIFFON:** Although we're looking at it
7 in the construct of completeness, so if these
8 people weren't monitored. And if they're
9 monitored for skin, they would also be
10 monitored for deep. You should see their
11 records, right? So that's really the issue
12 there, but I understand your point.

13 **DR. MAKHIJANI:** You also brought some deep
14 gamma issues in relation to the daughter
15 products.

16 **MR. GRIFFON:** Yeah.

17 **DR. MAKHIJANI:** Potential.

18 **DR. NETON:** But it's just not in the order
19 of two rem.

20 **MR. GRIFFON:** No, no, certainly not.

21 **DR. NETON:** Most of that is beta.

22 **MR. GRIFFON:** Yeah, yeah, we agree on that.
23 All right, I think this discussion is better
24 served for when we have NIOSH's response and
25 have more data in front of us.

1 work that Ron Buchanan was doing looking at
2 external dosimetry pretty much records in
3 terms of dose distribution, and in parallel, I
4 think he established for '69 and '70 that
5 there were a higher preponderance of zeros
6 recorded for that time period.

7 And that was something that we shared
8 with NIOSH, and I think it was sometime in the
9 summer. And NIOSH went forward to basically
10 look at the historic record to see if there's
11 any explanation for why we would see these
12 zeros, in some places blanks, particularly in
13 '69-'70 timeframe.

14 NIOSH came back, I think it was
15 sometime in the fall with at least two or
16 three explanations, hypotheses, as to what may
17 have occurred. And one was certainly that it
18 was an administrative decision. I think we
19 touched on that already that there was, in
20 fact, a policy that was put in place. And
21 then there was maybe a computer programming
22 error, but I think clearly we've established
23 that the policy, in fact, was the reason that,
24 a large reason why we were seeing these zeros.

25 And the evaluation that we, in fact,

1 performed was to go back and look at the
2 claimant files for the individuals that were,
3 in fact, identified for this period. And
4 there were 136 claimants that NIOSH identified
5 originally of which 35 had no external
6 dosimetry data at all for 1969. That's kind
7 of a starting point for the review that Arjun
8 and Kathy Robertson-DeMers did because I'm
9 going to just let you catch up on the review.

10 And I don't think this has actually
11 cleared Privacy Act review yet, so this is
12 something that with that one step we can
13 certainly, NIOSH provided.

14 **DR. MAKHIJANI:** Yeah, we've examined the
15 data relating to claimants, but I just want to
16 put a caveat about that in relation to all
17 workers. We had this discussion in relation
18 to the Nevada Test Site that really the goal
19 in an SEC is to examine the data for the class
20 of workers who are covered by the petition,
21 not the class of claimants.

22 And there's no systematic procedure as
23 yet for relating claimants to the whole group
24 of workers statistically. That said, we all
25 agree I think that it's very important to look

1 at the data that we have accessible which is
2 the data of the claimants. And that is fairly
3 plentiful so it's important to look at it.

4 As Joe said we looked at the HIS-20
5 database and found a number of zeros in 1969-
6 1970 went up and that was the cause of the
7 whole investigation. At first it might have
8 been hypothesized that it may be associated
9 with the fire, but NIOSH said that it was not
10 associated with the fire. There may be other
11 explanations, and I think we're in broad
12 agreement that it was not primarily associated
13 with the fire.

14 We looked at the various explanations.
15 Just to make it short we have some questions
16 about whether the computer error is relevant
17 to this particular issue or not. But there
18 was an error in the computer records, and
19 these gaps might be related to that. We do
20 agree that prior to the fire there was a
21 policy put in place not to read badges of
22 workers, or certain badges of workers in non-
23 plutonium areas and that that the gaps
24 appeared to be, at least were largely related
25 to this policy.

1 Now when this policy was, now we know
2 the policy started before the fire in 1969 and
3 then went on after that for some time,
4 probably into 1970. We don't know how far
5 beyond 1970 it might extend. And as I said
6 earlier in the completeness presentation,
7 there's also some indication that it may
8 precede 1969.

9 Now whether primary contractor workers
10 were not being issued badges in the '64-'69
11 period and so there are gaps or they were not,
12 they were issued badges that were not read is
13 not so clear. NIOSH had said the former, but
14 we don't have any documentation about that or
15 any policy statement that's comparable to this
16 1969 report where a policy was adopted.

17 There was a rather more unfortunate
18 aspect to the 1969 policy. So we did
19 corroborate that the non-reading, which was
20 about 1,000 badges in every cycle were not
21 being read, so quite a large number of badges.
22 We found that to issue badges and not read
23 them is not a sound policy, but the problem
24 was made much worse by discarding, the policy
25 of discarding the badges after a few weeks.

1 So there's now no way to go back and verify
2 whose badges were actually not read because
3 apparently the badges were discarded.

4 We looked at the various external dose
5 databases to see who this affected and how it
6 affected them and what was actually entered
7 into the record. There were four, the four
8 different databases where external dose data
9 are entered that are available in the claimant
10 files, there's the occupational dose report,
11 which is the handwritten summary dosimetry in
12 the Health Physics file.

13 There's a dosimetry history by
14 individual which is a computer printout
15 generated prior to the HIS-20 database
16 creation. There's the Health Physics External
17 Radiation Exposure Report, which is a
18 quarterly summary report. And there's the
19 HIS-20 computerized database which NIOSH is
20 using for its coworker model.

21 And so we looked at all four of these
22 to examine the evolution of how these zeros
23 got entered into the HIS-20 database. We
24 looked at 19 individual workers who are all in
25 the HIS-20 database. And there was one case

1 of a worker who's not in the HIS-20 database
2 just missing as part of the group of workers
3 that are not in that database whose case was
4 also important because there was a gap in 1969
5 in the data processing, the original log
6 books.

7 We looked at NIOSH's explanation that
8 where in the original badge processing logs
9 there's a zero across the place where the dose
10 is entered with arrows going down that --

11 **MR. GRIFFON:** Excuse me, everyone on the
12 phone. We've got some interference coming
13 through from someone's phone. I don't know if
14 someone's on a cell phone or changed through
15 speaker. Whatever you're doing now, do what
16 you were doing before.

17 **DR. MAKHIJANI:** Where was I? Yes, the zeros
18 that were in the film processing logs that
19 went down with an arrow at the dose, but there
20 was no densitometer reading, seemed to
21 indicate the times, at least in the year in
22 1970 when the badges were not read. And in
23 those records the Health Physics External
24 Radiation Exposure Report generally shows gaps
25 or there's nothing. But the dosimetry history

1 by individual in the HIS-20 database actually
2 replace the blanks by zeros.

3 So as a result now the HIS-20 database
4 has got two kinds of zeros that are mixed up.
5 There are zeros that were entered because a
6 result, a badge was read and was less than the
7 detectable limit, and there are zeros because
8 a badge was not read that was actually issued.
9 And because the badge has been thrown away,
10 this raises some pretty serious questions
11 about data integrity.

12 We didn't find that there was an
13 intent to fabricate data, to actually write
14 zeros when there were high readings or
15 something like, but to write zeros where there
16 was no actual reading of a badge is a problem
17 in data integrity. And this database,
18 therefore, where there are zeros is
19 fundamentally flawed in that respect.

20 So unlike the earlier discussions we
21 had about gaps, there is this extra problem in
22 the HIS-20 database where --

23 **MR. GRIFFON:** Arjun, you might have said it
24 already, but how many individuals did you find
25 this flaw?

1 **DR. MAKHIJANI:** Well, we looked at 19
2 individuals who had complete blanks, we looked
3 at 19 individuals whose badges we determined
4 could not be read, and I think we had that
5 same understanding of whose badges were not
6 being read, as NIOSH.

7 **MR. GRIFFON:** Excuse me, we're still getting
8 bad interference from someone's phone, so I
9 don't know if people, if you've done something
10 differently maybe hang up and dial in again or
11 try a different phone. We'd appreciate it,
12 very loud static coming through. And it's
13 stopped now.

14 **DR. MAKHIJANI:** So maybe I should have said
15 something about how we pick the 19 claimants
16 to look at. Nineteen sixty-nine is peculiar
17 in that we actually looked at workers with
18 partially complete, partially incomplete and
19 partially complete gaps. So there are workers
20 who had gaps for part of 1969. There are
21 workers who had gaps, that is, badges not read
22 for all of the year.

23 So we thought to focus on those
24 workers who had gaps for the whole year
25 because that way we could determine whether

1 the zeros that are in the HIS-20 database
2 actually correspond to gaps or not because
3 otherwise it'd be rather more difficult. And
4 so we focused on 19 individuals who, among the
5 1969 workers who did not have any external
6 dose records in their original badge
7 processing files, whose badges were not read,
8 and examined what was there in the other
9 databases where their doses were recorded.

10 And as I said the result was that in
11 the dosimetry history by individual computer
12 printout, out of these 19, there were zeros
13 for ten individuals instead of the blanks or
14 gaps, and there was no dosimetry history by
15 individual file for nine individuals. And for
16 all 19 cases the gaps or blanks have been
17 replaced by zeros in the HIS-20 database.

18 So that was the result of that
19 analysis. And you have the case-by-case
20 analysis in the full report which is covered
21 by the Privacy Act, with you. So there could
22 be a number of, so the conclusion is that
23 unread badges were being entered as zeros in
24 the HIS-20 database. And to some extent also
25 in the dosimetry history by individual

1 computer printouts. So the problem seems to
2 have originated somewhat prior to the HIS-20
3 database but was carried over and aggravated
4 by the HIS-20 database compilation.

5 There are a lot of reasons for concern
6 about this conclusion. We looked at the same
7 workers' records for 1968 and 1971 to see
8 perhaps whether the zeros might correspond to
9 a situation where they had no exposures in the
10 earlier years but their badges were actually
11 read. And we found that there was an increase
12 in the number of zeros from '68 to '69, that
13 there were workers who had non-zero doses
14 recorded in the earlier years immediately
15 preceding who suddenly had zeros in the HIS-20
16 database and whose badges were not read.

17 So it's not clear that the badges of
18 workers, that the workers whose badges were
19 not being read had all uniformly low exposure
20 potential. We looked at the case of one
21 worker who was not in the HIS-20 database but
22 whose case seemed to be quite important even
23 though there's no record in the HIS-20
24 database of his file, and to bring up his
25 sample.

1 **MR. GRIFFON:** Careful not to reference too
2 specifically.

3 **DR. MAKHIJANI:** Yes, I will not.

4 **MS. HOMOKI-TITUS:** You might want to tell
5 them somebody who --

6 **DR. MAKHIJANI:** Well, maybe, maybe not.
7 Maybe not.

8 **MR. GRIFFON:** Hold off on that.

9 **DR. MAKHIJANI:** Yes, just hold off. I need
10 to find the, yes, here.

11 This person is listed as a non-
12 plutonium worker so he would fit into the
13 general description of workers who were
14 covered by the non-reading of badges, but
15 actually worked in a lot of different areas.
16 And so there's the question of whether the
17 workers who are described and officially
18 assigned to non-plutonium areas were more
19 frequently also working in plutonium areas.

20 Also, we found quite significant, more
21 than the ten percent limit doses recorded in
22 every year for four years prior to the, prior
23 to 1969. And then the badges were not read in
24 1969. So this is a sort of a particular case
25 and NIOSH has the data, claimant numbers and

1 all of that information on this particular
2 person. So that example actually raises a lot
3 of different questions about job assignments
4 as they are in the, as they actually happened
5 compared to the policy of whose badge was not
6 being read in 1969.

7 **MS. MUNN:** Arjun, what, do you have the
8 figures post-1969 for the same individuals?

9 **DR. MAKHIJANI:** We do.

10 **MS. MUNN:** And do you see better comparisons
11 between the post-'69 and the pre-'69 figures
12 such that you can, so that you are convinced
13 that there was not likely a change in their
14 work history during that particular period?

15 **DR. MAKHIJANI:** We looked at people whose
16 work histories did not change over certain
17 periods of time prior to and after 1969, and
18 maybe Kathy can elaborate on what I'm saying.
19 And part of the reason for the concern is both
20 immediately prior and immediately after some
21 of the people whose badges are not being read
22 do show non-zero doses.

23 **MS. MUNN:** The static is back.

24 **MR. GRIFFON:** Yeah, can I ask everyone on
25 the phone, I know this is kind of a hassle,

1 but if everyone could just hang up and redial
2 back in. And we'll pause for a minute and let
3 --

4 **UNIDENTIFIED (by Telephone):** I think
5 someone out there may have a Blackberry, and
6 they need to disable that. That's what the
7 static is often associated with a Blackberry
8 trying to pick up mail from the server.
9 That's what it sounds like to me.

10 **DR. WADE (by Telephone):** I'm going to leave
11 you now, too, Mark. I wish you well.

12 **MR. GRIFFON:** Lew, thanks.

13 **MS. DeMERS (by Telephone):** Wanda, this is
14 Kathy. Arjun is right. We selected
15 (unintelligible) table -- can you guys hear
16 me?

17 **MS. MUNN:** Yes, we can.

18 **MR. GRIFFON:** Yeah, we can hear you.

19 **DR. MAKHIJANI:** Be careful, all right,
20 Kathy?

21 **MS. DeMERS (by Telephone):** -- so that they
22 had the same job title before 1969 and then to
23 1970, and they were also assigned to the same
24 area.

25 **MS. MUNN:** Yeah, okay, I just, I understand

1 that consistency. It's just it's difficult
2 for me to not expect that there would have
3 been some change in the way operations were
4 conducted for awhile after that major fire. I
5 would just assume that a lot of people, even
6 though they went back to their former jobs
7 afterwards, would somehow have been in some
8 other part of the site doing some other kinds
9 of work for a short period surrounding that
10 massive incident. I don't know how we could
11 show that, but you've answered my question,
12 thank you.

13 **MS. DeMERS (by Telephone):** This is Kathy.
14 Remember that we're talking about uranium
15 workers here. And the only shift they would
16 have was to the plutonium area. We're
17 actually going from an area that's supposed to
18 be lower exposure to higher exposure.

19 **MS. MUNN:** Except that the plutonium had all
20 been taken out, and so it's a different
21 ballgame. But I understand and my question
22 has been answered. Thank you.

23 **MS. DeMERS (by Telephone):** One thing I
24 would like NIOSH to provide to us is some sort
25 of actual indication that the doses dropped in

1 the 777 service area after the fire because
2 we're talking about that, but we haven't seen
3 anything like a survey report particularly on
4 the external dosimetry or anything like that
5 that did occur.

6 **MR. GRIFFON:** Okay, we'll go back to that,
7 but let Arjun finish up his report.

8 **DR. MAKHIJANI:** Let me just finish up the
9 conclusions about 1969 data integrity and
10 where we wound up.

11 So there are four major bullets of
12 issues that arise in relation to data
13 integrity in the 1969 investigation. Not
14 reading badges, not consonant with sound
15 practice and throwing away the badge after a
16 few weeks converted a problem of unsound
17 practice to a problem of data integrity
18 because it cannot now be verified as to what
19 the doses were and whether the assumption of
20 lower exposures was valid.

21 We tried to examine that in other
22 ways, and we would have definitely had some
23 questions about whether that assumption was
24 generally valid for the people whose badges
25 were not read. There are indications that it

1 was not.

2 Non-reading of badges appears to have
3 been done with the intention of minimizing
4 work, but there's some indication that this
5 was, at least for some workers, an erroneous
6 belief and notably for shallow dose. The
7 entry of zeros in regard to the entry of zeros
8 in some data records when badges were not read
9 is a data integrity question about data
10 recording practices for as long as that
11 practice went on.

12 And we have some question whether it
13 was initiated as a de facto practice without
14 being declared before 1969. And it was there
15 definitely in '69, continued into 1970, and
16 when exactly it was stopped is not clear as
17 we've discussed before. And we have some
18 examples of workers whose badges were not read
19 whose formal assignment did not include
20 plutonium areas who did work in plutonium
21 areas.

22 And there's also the case of one
23 worker who was involved with the fire who
24 apparently, whose badge was not read. So
25 there's that problem that also arose in our

1 survey.

2 **MR. GRIFFON:** The one with the fire, it was
3 a response capacity?

4 **DR. MAKHIJANI:** Yes, in a response capacity.

5 **MS. DeMERS (by Telephone):** Now, he was a
6 fireman who fought the fire.

7 **DR. MAKHIJANI:** Yeah, that's what I said.
8 So that's why I said in a response capacity to
9 the fire.

10 **MR. GRIFFON:** Apparently, I see Brant maybe
11 not agreeing with that.

12 **DR. ULSH:** Well, I don't agree or disagree.
13 What I need to check though, I think the
14 report says fire suppression. And we do know
15 that there were people, and I don't know if
16 this applies to this individual or not, there
17 were people who were involved in fire watch,
18 fire suppression, who never went in the
19 building at all. And I don't know if this is
20 one of those people or not. What we have
21 heard from the people who were involved in the
22 immediate aftermath of the fire was that only
23 the professional staff went in, and they,
24 after the fire, and they were monitored. So I
25 don't know. We've got to look a little closer

1 on this one.

2 **MS. DeMERS (by Telephone):** Do you want me
3 to respond to that?

4 **MR. GRIFFON:** I don't know if it's worth it
5 at this point. There's just a question there
6 I think. Let's leave it at that for now.

7 **DR. MAKHIJANI:** And as before in the
8 completeness investigation, we haven't kind
9 of, we felt that our instruction from the
10 working group was to examine the issue to see
11 if there was one, and that the detailed work
12 of resolving it was NIOSH's work and not our
13 work. So we haven't tried to track all these
14 issues down to the last, and so it may well be
15 that there's a good explanation or not. And
16 that we've left up to NIOSH.

17 The conclusions in regard to the
18 overall situation with the 1969 data is that
19 overall the gaps don't appear to be related to
20 the fire although there's some fire-associated
21 questions but largely to this policy of not
22 reading badges. And there is questions of
23 data integrity and also about how the coworker
24 models are going to be developed with uranium
25 workers which we also raised earlier, the

1 complication with 1969 compared to the 1950s
2 just to be clear.

3 In the 1950s there was a policy of not
4 badging a certain group of workers, and they
5 were not badged, and there was no data
6 integrity problem there. Here there were
7 badges that were issued -- maybe I can just
8 talk very loudly, overcome the static.

9 Here there were badges that were
10 issued that were not read and were
11 subsequently thrown away so this is a much
12 different issue. And that to some extent at
13 least corroborates the petitioners that there
14 were zeros entered into some dose records when
15 the badges were not being read. That's an
16 issue that's been raised in the petition, and
17 while in the earlier period we did not find
18 that, it was simply people who were not
19 badged. Here there is a more substantial
20 issue of data integrity.

21 **MR. GRIFFON:** Can I ask, Arjun, did you, I
22 know you were focused on the '69 period, did
23 you find this practice in other time periods
24 beyond, I think you said '70 there might have
25 been some, too --

1 **DR. MAKHIJANI:** It goes into 1970, but we
2 did not actually go into individual dose
3 records --

4 **MR. GRIFFON:** -- prior to or after that?

5 **DR. MAKHIJANI:** Well, there's the one case
6 that we have of a person with 11 years of
7 blank records from '63 to '74 that came up in
8 the data completeness question in the very
9 first set that we examined. Actually, I think
10 it was the very first one that I looked at
11 which caused me to sit up. And --

12 **MR. GRIFFON:** And in that instance there
13 were blanks all through the hard copy file,
14 but the database had zeros for that --

15 **DR. MAKHIJANI:** Yes.

16 **MR. GRIFFON:** -- those 11 years? Or do you
17 know?

18 **DR. MAKHIJANI:** Well, I don't know that the
19 database has zeros because I've not tracked
20 the individual's HIS-20 file. I know that
21 this was a worker that was supposed to be
22 badged because they were a prime contractor
23 worker. NIOSH said in a working group meeting
24 that they were not badged, but we have no
25 documentation of that.

1 **MR. GRIFFON:** Well, we have no policy sort
2 of thing to see, right, right.

3 **DR. MAKHIJANI:** And so they may have been
4 issued a badge, and there may be no readings.
5 Or they were not issued a badge. But in both
6 cases it kind of raises a pretty big question
7 of was there really ever a universal badging
8 policy in place for prime contractor workers
9 and who was not badged, if NIOSH's statement
10 is to be taken at face value? Or if not, was
11 this policy initiated more formally in 1969 of
12 not reading large numbers of badges to save
13 work, actually de facto introduced at some
14 earlier time and then formalized in '69, and
15 then stopped at some time maybe when TLDs were
16 introduced. It's unclear. There are a lot of
17 questions there. We can make some guesses,
18 but --

19 **MR. GRIFFON:** Yeah, let's not make guesses.

20 Brant, I'm sure you pretty much --

21 That's it, Arjun, for a summary?

22 **DR. MAKHIJANI:** (no audible response)

23 **MR. GRIFFON:** Go ahead, Brant.

24 **DR. ULSH:** We certainly agree that there are
25 more zeros in '69, and it looks like from the

1 figures that SC&A has put in their report,
2 possibly into '70 as well. As Arjun mentioned
3 when this issue was first brought to our
4 attention, we considered a number of
5 hypotheses, the first of which, I mean the
6 most obvious of which would be some connection
7 with the fire. And we eventually determined
8 that it was not related to that.

9 **MS. MUNN:** Static again.

10 **DR. ULSH:** But I want to be clear. The
11 population that this issue affects, this
12 policy of not reading the badges of people who
13 were in the non-plutonium areas, there's
14 another criteria in there who were on
15 quarterly badge exchange cycles. Now these
16 were people who were judged by the health
17 physics staff to be at low exposure potential.
18 And we can discuss whether or not they could
19 make that determination adequately.

20 But we are not talking about all
21 people who are in non-plutonium areas, only
22 those who are on quarterly. There were also
23 people who were on monthly exchange cycles,
24 more frequent than quarterly. So the issue
25 that we have here is for the people who are on

1 quarterly, and that's the cohort that was
2 judged to be a low exposure potential.

3 Now we also have discussed in the past
4 that in terms of 1970 there was a strike that
5 occurred in the summer of 1970, lasted for
6 about 70 days. And also you have the '69
7 fire, of course, which disrupted production in
8 the highest exposure areas of the site. It
9 took the people onsite who, in general, got
10 the highest exposures and put them in a non-
11 production role in some cases. So you would
12 absolutely expect to see higher frequencies of
13 zeros. That's not surprising.

14 Now in terms of this policy, you know,
15 it's certainly not the way I would have done
16 things, but that's not really the question.
17 The question is does it prevent us from doing
18 dose reconstructions with sufficient accuracy.

19 Now, I don't want to commit to a work
20 around on this until we finish our analysis,
21 but one thing that I would like to put on the
22 table for the working group and SC&A to
23 consider is that given that we have a cohort
24 of people who were judged by the health
25 physicists at least to be at low exposure

1 potential, what would be, I mean, if we decide
2 that those people, that cohort of people, the
3 quarterlies, could not be used because we
4 can't differentiate real zeros from really
5 unmonitored doses that were artificially
6 converted to zeros.

7 If we decide at the end, and I'm not
8 saying we are, but if we decide at the end
9 that that population of data is corrupt, and
10 we can't use it, we can't rely on it, what
11 would be the effect of not using that data?
12 Of taking the quarterly badge exchange cycles
13 and not considering them?

14 Well, if you think about --

15 **MS. MUNN:** Static again.

16 **DR. ULSH:** I hope you're talking about the
17 reception and not me.

18 **MS. MUNN:** No, but that is a Blackberry. I
19 do wish you'd take your PDA and place it
20 elsewhere.

21 **DR. ULSH:** So if you look at the
22 distribution of coworker, the distribution of
23 the population of doses that you have, and you
24 take out the people who are on quarterly, what
25 are you doing? Well, in general, and I'm not

1 saying in every single case but in general,
2 speaking from a population standpoint, what
3 you're doing is you're lopping off the lower
4 end of your coworker distribution so that when
5 I pick a 95 percentile value or a 50
6 percentile value or whatever it is that we
7 pick, the value that I pick without the data
8 would be higher than the value I would pick
9 with that data in there.

10 So in effect at the end of the day, if
11 we say this data's no good, we take it out.
12 That's a claimant favorable thing to do in
13 terms of assigning coworker doses to
14 unmonitored people. And that's what we're
15 talking about here. These people whose badges
16 were not read, in fact, they're unmonitored.
17 That's what they are. They wore badges, but
18 those badges weren't read. So it's the same
19 as if they weren't wearing them.

20 And if you look at the coworker data
21 that, the values of coworker data that we are
22 proposing, that we have in our TIBs for 1969,
23 it is far, far, far higher than you see for
24 people, you know, the lowest exposure people
25 on the site. So I'm not committing to that

1 approach. I'm just saying that when you think
2 about this in terms of what is its relevance
3 in terms of an SEC consideration, that is
4 something that we should think about.

5 Now one of the conclusions that SC&A
6 has in their report here I have to express
7 some caution about. It says while the non-
8 reading of badges may have been done with the
9 attempt to minimize work -- well, let me just
10 read it in total.

11 "While the non-reading of badges may
12 have been done with the intent of minimizing
13 work related to reading badges of workers
14 judged to have low exposure potential, the
15 facts relating to at least some non-plutonium
16 work indicate that this was an erroneous
17 belief, notably for shallow dose."

18 Now am I correct in assuming that that
19 refers to the uranium foundry workers or does
20 that refer to something else?

21 **MS. DeMERS (by Telephone):** No, it's not
22 related to them.

23 **DR. MAKHIJANI:** Right, Kathy. Go ahead.

24 **MS. DeMERS (by Telephone):** When I went and
25 investigated gaps, I did a spread from various

1 buildings and just for example, there's a --

2 **MS. MUNN:** Static, there's static out there.

3 **MS. DeMERS (by Telephone):** It's probably
4 coming from my phone.

5 **MS. MUNN:** Well, I hope not. We need you.

6 **MS. DeMERS (by Telephone):** Just to give you
7 an example, there's an administrative building
8 --

9 **MR. GRIFFON:** A little louder if you could,
10 Kathy.

11 **MS. DeMERS (by Telephone):** There's an
12 administrative building, 111, and normally
13 they're not routinely in the field, but they
14 do periodically go into the field. And in one
15 case on our table we have an industrial
16 photographer. Well, he happened to have
17 photographed all those wonderful pictures of
18 the fire, and subsequent pictures of the
19 cleanup. So there's an example where, no,
20 they're not coming from the foundry, they're
21 not coming from the immediate uranium area,
22 they're just a professional that had the
23 opportunity to intermittently go out into the
24 field.

25 Some of the people we looked at were

1 machinists.

2 **MR. GRIFFON:** Machinists.

3 **MS. DeMERS (by Telephone):** Some of them
4 were equipment operators. We have an
5 electrician.

6 **MR. GRIFFON:** Okay, so it's broader than the
7 uranium and foundry workers is what you're
8 saying.

9 **MS. DeMERS (by Telephone):** Right.

10 **DR. MAKHIJANI:** Mark, the data are in your
11 write-up in Table X-4, and it does show a
12 sampling of different buildings, different job
13 types. They are largely from Building 444,
14 but there's also the 881 and 883 and 111, 331.
15 And you see quite large beta doses, relatively
16 speaking, in at least two, three, four cases.
17 And these are all cases in the last, where
18 these beta doses are recorded in the last
19 quarter of '68. And in all these cases if you
20 look at the first quarter 1969, the badges
21 weren't being read.

22 **DR. ULSH:** Okay, now I understand what
23 you're saying. Okay, we'll take a closer look
24 at the Table X-4. Arjun, I'm looking at the
25 de-identified version. I think you guys also

1 sent us one where it does identify these
2 individuals, right?

3 **DR. MAKHIJANI:** Yes.

4 Kathy, did we send all the claimant
5 numbers -- I do not remember now -- to NIOSH?

6 **MS. DeMERS (by Telephone):** If you don't
7 have them, I can pull those up.

8 **MR. GRIFFON:** We'll make sure it happens if
9 you don't.

10 **DR. MAKHIJANI:** I don't know if we actually
11 in this case sent you a version with claimant
12 numbers. At least I don't remember seeing one
13 with claimant numbers.

14 **MR. GRIFFON:** And this report from what I
15 understand is still under Privacy Review. Is
16 that correct?

17 **DR. ULSH:** I think, Joe, is that what you --

18 **MR. FITZGERALD:** Yeah, that's my
19 understanding. The copy I have has a notation
20 that it's subject to Privacy review, and I
21 think we sent it to you and Brant back in the
22 10th of January. I think that's the only one
23 that hasn't come back. Now there's been so
24 much going back and forth that I think we just
25 need to validate that that's where it stands.

1 But I believe that's where it is.

2 **MR. GRIFFON:** I just want to, again, and
3 this goes for all the, those four items that
4 we'll discuss the rest of the day, that we'll
5 commit to getting these to the petitioners'
6 interested parties as they're cleared for
7 Privacy concerns.

8 **DR. ULSH:** So like the other sections of
9 SC&A's report, we are still reviewing this.
10 And this is one where in contrast to some of
11 the other sections, I think SC&A sees a
12 potential at least for SEC implications. I
13 don't see any disagreement.

14 **DR. MAKHIJANI:** Well, this is, of course, up
15 to the Board. We did raise the question about
16 dose reconstructability given the state of the
17 data for this group of workers. But there's
18 also that to some extent we raised the
19 question also in regard to some workers in the
20 1950s that it's not a separate question that
21 the dose reconstructability for 1950s is
22 settled for the uranium workers.

23 **DR. ULSH:** Well, where I'm headed with this
24 is that this is one where since there's at
25 least some belief that there might be SEC

1 implications, that this is one that we're
2 going to focus on more than some of the other
3 ones like, you know, we're going to get into
4 log books and whatnot. This would be a higher
5 priority for us.

6 **MR. GRIFFON:** It's certainly a high priority
7 I think. All of the data included in this
8 section I think is a high priority and with
9 '69 maybe being the highest of that.

10 **DR. ULSH:** So yeah, we're going to be
11 preparing a detailed response. We'll look at
12 each of the individual cases here. And like I
13 said, the point that I just want to make is
14 that we are not talking about all 1969 data.
15 We are talking about quarterly data for non-
16 plutonium areas.

17 **DR. MAKHIJANI:** This is correct that I
18 should have mentioned that we're talking about
19 quarterly data so that I omitted that fact.
20 And I also omitted something else which is
21 that there were some badges that were
22 contaminated after the fire. And both during
23 worker interviews and in some documentation
24 it's indicated that some badges at least were
25 thrown away. Not again, for nefarious

1 purpose, but simply because you don't want to
2 contaminate the reading equipment and so on.
3 But some badges of people involved in the fire
4 would have been thrown away. So some of the
5 zeros may be related, or gaps, may be related
6 to that.

7 **MR. GRIFFON:** Did you do follow up to see
8 because the suggestion I saw in some of the
9 log books was that badges were destroyed for
10 those contamination reasons, right?

11 **DR. MAKHIJANI:** Right.

12 **MR. GRIFFON:** But I thought I saw, at least
13 one of the log books suggested that health
14 physics assigned or assigned a dose to the
15 individual --

16 **DR. MAKHIJANI:** Kathy would have looked at
17 that.

18 **MR. GRIFFON:** -- and I don't know if you
19 cross-walked any of those.

20 **DR. MAKHIJANI:** Kathy, did you?

21 **MS. DeMERS (by Telephone):** I took all of
22 the discussion of badged individuals and
23 included them in the log book review.
24 Unfortunately, only two of them had claimant
25 files. And those two, if I remember, did not

1 have the dosimetry investigation in their
2 file.

3 **MR. GRIFFON:** Did they have anything in
4 their record, in their recorded dose for that
5 quarter or year? That may be a little
6 inconclusive there because they may have had
7 other periods where they had monitoring and
8 the whole year would add something.

9 **MS. DeMERS (by Telephone):** I don't think we
10 were able to define the particular badge
11 period.

12 **MR. GRIFFON:** Okay, maybe we'll catch that
13 in the log book stuff, too, but I just
14 wondered if any of that had been tracked
15 through.

16 **DR. MAKHIJANI:** Kathy would have looked at
17 this. I certainly did not.

18 **DR. ULSH:** Well, there were a couple of
19 points there that I can maybe speak to now.
20 All of our indications are that when people
21 went in immediately after the fire to assess
22 the situation and to remove the plutonium,
23 that those people were fully suited and double
24 badged. So I mean, it is certainly possible,
25 and I think it was even probable, well, I

1 don't think there's any question that on
2 occasion badges became contaminated and were
3 disposed of. And those are noted in
4 Kittinger's logs and the notation said that
5 that was witnessed by other people.

6 Now in terms of the lack of
7 investigation reports, I don't know. I'd look
8 at the agenda again. We may get to that some
9 other place on the agenda, but as we've
10 discussed in the past, you would expect to
11 find the abbreviated or extended dosimetry,
12 sorry, dose reconstruction investigation I
13 think is the title of it, in the later
14 periods. You know, we provided those
15 procedures. In the earlier periods you would
16 not necessarily expect to see the same kind of
17 documentation.

18 **MS. MUNN:** Worse than static.

19 **DR. ULSH:** That's not to say though that
20 investigations weren't done, just that they
21 didn't have a formal mechanism like they did
22 in the '90s, I don't know what the time period
23 was, where they had a standard form that they
24 wrote up the investigation on. We have seen
25 from various documents that I believe Kathy

1 might have supplied, although don't hold me to
2 that, there were some individuals where, just
3 for example, the, I think it was the neutron
4 badges were higher than they expected.

5 And it clearly indicates that that
6 situation was investigated and that doses were
7 assigned. So I mean there are situations that
8 indicate that investigations were done. It's
9 just the documentation is not the same as it
10 was in the '90s.

11 **MR. GRIFFON:** I guess that was my point is
12 that the log books seem to suggest that they
13 did attempt to assign some dose. And if you
14 cross-walk that and see there was a blank then
15 that might be an issue. But if there's some
16 dose recorded --

17 **DR. ULSH:** Right.

18 **MR. GRIFFON:** -- then, you know, it might
19 be within their procedures.

20 **DR. ULSH:** Well, we interviewed a couple of
21 people on this, one of whom was, okay, I
22 pause, but I think that's okay, one of whom
23 was Bob Bistline who was the site expert that
24 SC&A employs, and he strongly disagreed with
25 the suggestion that they would have just

1 assigned zero in a situation. They always,
2 okay, I don't want to say always again, but it
3 was the policy to investigate situations where
4 badges were suspect or had to be discarded.
5 So I mean, we've heard that from a number of -
6 -

7 **MR. GRIFFON:** Well, I'm just simply asking
8 the simple question, these log books actually
9 have specific badge numbers, and if you can
10 cross-walk them that may actually strengthen
11 that.

12 **DR. ULSH:** Do I hear an action item?

13 **MR. GRIFFON:** No, but I think we might pick
14 that up in the log book analysis. I think
15 it's already in that so that discussion --

16 Kathy, unless you want to, some of
17 this I think gets into our log book
18 discussions.

19 **MS. DeMERS (by Telephone):** Actually, in all
20 the entries we pulled out of the log books I
21 think there was one that indicated that there
22 was an investigation in the field.

23 **MR. GRIFFON:** Okay, but again, we don't know
24 if, the documentation process in the early
25 years versus the later years, I mean, I think

1 we can discuss this further. I think I'd like
2 to save it for the log book because I know we
3 have it in there.

4 I mean, I guess for the '69 question
5 really, you're looking into this, the only
6 thing I would say is that we keep saying '69
7 and I guess the thing that jumps out at me in
8 this discussion is the blanks and having zeros
9 entered in the HIS-20. And it brings up this
10 whole question of the integrity of the HIS-20
11 database period.

12 And I think to the extent we can, and
13 this might involve SC&A, I'm not sure who
14 should have this action, but I know out of
15 those other cases it seems to me that it
16 wasn't only necessarily a '69 issue. Or you
17 had that one example of the first twelve cases
18 where you had 11 years, but you didn't then
19 look and see if that carried through to the
20 database if the blanks in that individual's
21 records carried through to zeros in the
22 database.

23 And I think that, you know, I have a
24 question in my mind is was this just in '69
25 where you had some blanks inadvertently or for

1 whatever reason entered as zeros in the
2 database or is that in other time periods as
3 well. And maybe all of this can be resolved
4 like you said. I hear your option about
5 potentially you could just drop this quarterly
6 and that may --

7 **DR. ULSH:** And this ties back again to that
8 question you asked earlier, Mark, about when
9 did that non-read policy end, right?

10 **MR. GRIFFON:** Right, partially, yeah.

11 **DR. ULSH:** If that question could be
12 answered it might put a --

13 **MR. GRIFFON:** Shed some light on all of
14 this, yeah.

15 **MS. DeMERS (by Telephone):** I have a
16 suggestion.

17 **MR. GRIFFON:** But it also that one example
18 is prior to '69, too, which is a little --

19 **DR. ULSH:** This is the individual with 11
20 years, the administrative assistant?

21 **MR. GRIFFON:** Yeah.

22 **MS. MUNN:** Kathy's trying to say something.

23 **MR. GRIFFON:** Go ahead, Kathy.

24 **MS. DeMERS (by Telephone):** I have a
25 suggestion on when the policy may have ended,

1 and you can check this out. The uranium areas
2 were among the last people to be assigned the
3 TLDs towards the end of '70, and that policy
4 may have ended with the assignment of TLDs to
5 different groups.

6 **MR. GRIFFON:** Yeah, I think Brant kind of
7 suggested that earlier, so if we can, you
8 know, have that may, but then that raises the
9 question of if individuals have blanks beyond
10 that, why? So it's the same I've raised as
11 before. That if the policy were short term it
12 may explain this spike in the number of zeros
13 for that one year, but it doesn't explain the
14 gaps or these blanks in other years beyond
15 that time period.

16 **DR. ULSH:** What I would suggest to you,
17 Mark, is that we get back to you after we have
18 looked at those TLD worksheets or results, TLD
19 results, and see if we see the same pattern.
20 Then we can go forward.

21 **DR. MAKHIJANI:** Mark, I think maybe two
22 action items and probably for NIOSH, but two
23 action items that would help in clarifying
24 these issues at least. If these same
25 individuals that we've looked at could be

1 tracked into the TLD period and before 1969,
2 that would be very useful to see what kind of
3 records they have and whether there was a non-
4 reading policy.

5 And in regard to that one case with 11
6 years of blanks, if we could look to see if
7 that person is in the HIS-20 database and what
8 might be entered there. And similarly for the
9 cases that have gaps in the '50s where there
10 were no badges issued whether who was there in
11 the HIS-20 database and what's in the HIS-20
12 database. That'd be obviously important
13 because of its use for the coworker model.

14 So I think that would clarify at least
15 some of the issues that are on the table in
16 regard to what's in that database and the
17 status of these individuals and maybe when
18 these policies began. I'm not sure that it
19 will, but it may.

20 **MR. GRIFFON:** And I think this will be,
21 probably you can roll this into your response
22 to these, the first two items anyway, so that
23 makes sense.

24 **MS. JESSEN:** Three items. Weren't there
25 three?

1 **MR. GRIFFON:** Were there three?

2 **DR. MAKHIJANI:** Maybe there were.

3 **MR. GRIFFON:** Two and I thought you rolled
4 into a third. Should we restate those? Just
5 for clarity restate those, Arjun. Track the
6 individuals found in your '69 review, right,
7 back in the prior years and future years?

8 **DR. MAKHIJANI:** And future especially if
9 there's a clear suggestion that their TLDs
10 were being read then we will have a pretty
11 good answer about the ending date for this
12 policy.

13 And then there's the one case of the
14 administrative assistant --

15 **MR. GRIFFON:** Yeah, 11 year case, yeah.

16 **DR. MAKHIJANI:** -- and then there's the gaps
17 from the data completeness, so those are
18 three, three things.

19 **MR. GRIFFON:** The last one is the gaps from
20 the --

21 **DR. MAKHIJANI:** Gaps from the data
22 completeness, whether they're zeros in the
23 HIS-20.

24 **MR. GRIFFON:** From your '52 case review,
25 right?

1 **DR. MAKHIJANI:** Yeah, from the case reviews
2 in the first paper that we discussed.

3 **MR. GRIFFON:** Anything else on '69 because I
4 think we're ready to --

5 **DR. MAKHIJANI:** I think that's it.

6 **MR. GRIFFON:** -- break for lunch.

7 Anything else, Brant?

8 Okay, I think we'll break for lunch
9 and come back at 1:30, and we're off the
10 record now.

11 (Whereupon, a lunch break was taken at 12:27
12 p.m. and the meeting resumed at 1:35 p.m.)

13 **MR. GRIFFON:** We're reconvening the work
14 group meeting, the Rocky Flats work group
15 meeting, and I think we're on to item three.

16 Now, I did have a follow-up question
17 on the first two items we covered, the data
18 completeness item, specifically, I know that
19 we talked about the policies around the
20 external monitoring program. And I think it
21 might be worth, at least for me I would like
22 to see if you can incorporate into your
23 response something about the internal
24 monitoring requirements and how they pertain
25 to the gaps or non-gaps in the SC&A report.

1 For instance, if you have someone that
2 has annual plutonium samples, but the policy
3 said for that building they should have been
4 on quarterly or something, you know. I don't
5 think that they got into that detail, but I
6 think that might be, you know, if we're
7 looking to see if policies are consistent with
8 what we're finding in the data, I think that
9 might be useful.

10 I'm still getting that echo. I was
11 hoping that would go away.

12 **DR. MAKHIJANI:** And, Mark, as I said in my
13 introduction to the completeness thing, we
14 used a very broad screen and besides the time
15 periods and the intra-year data, within the
16 year results of the radionuclide question. So
17 there, you know, this is just one aspect of
18 completeness that we did.

19 **MR. GRIFFON:** And I should also say that I
20 don't know if this is a complete new sub-
21 action on this item or anything because it
22 may, I'm not, I was going to go back and I
23 didn't get a chance to go back to the internal
24 dose site profile so you may have laid a lot.

25 I think you have some of that

1 information in there on who, what type of
2 monitoring was done, what time periods and
3 things like that. So some of that may be
4 there already. I'm not looking to recreate,
5 you know, if you already have it there, it's
6 fine. Just maybe bring it to our attention.

7 **MR. BUCHANAN (by Telephone):** Mark, this is
8 Ron Buchanan. Can you hear me?

9 **MR. GRIFFON:** Yes, go ahead, Ron.

10 **MR. BUCHANAN (by Telephone):** One thing that
11 I have suggested, and I don't think that
12 anyone's ever done is on the '69-'70 that if
13 we go back and look at the internal dose data
14 and see if it has the same spike and number of
15 zeros, it might shed a little light on why
16 these occurred in external doses.

17 **MR. GRIFFON:** Yeah, I don't know that we
18 looked at that. I'm not, I don't think that's
19 been raised before.

20 **MR. BUCHANAN (by Telephone):** I don't know.
21 It just might shed some light on why there was
22 or wasn't a reason for the increase in the
23 zeros and see if the same thing happened in
24 the internal doses.

25 **MR. GRIFFON:** How would that shed some

1 light?

2 **MR. BUCHANAN (by Telephone):** Well, if we'd
3 seen the same thing. If we didn't see that,
4 well then we would see that these people were
5 being monitored and there's something wrong
6 with the external dose. But if there was the
7 same scenario in the internal dose then that
8 would probably shed a different light on why
9 this was being done.

10 **MR. GRIFFON:** It may. It may I guess I
11 would say for these 20 or so cases that were
12 brought up for the '69, is it 20 individuals?

13 **DR. MAKHIJANI:** The 19 individuals who had
14 the zeros in the HIS-20 database, and then
15 there's the one individual that's not in the
16 HIS-20 database. So there are 20 in all.

17 **MR. GRIFFON:** See, I'm not sure it
18 definitively answers, addresses any questions
19 because they, I think Brant was suggesting
20 earlier that it was possible that they were on
21 some sort of internal program but not required
22 to be badged or didn't read their badges. I
23 don't know.

24 **DR. ULSH:** Yeah, I mean, keeping in mind
25 that I think we've agreed, SC&A and NIOSH have

1 agreed that it's at least consistent with this
2 badge non-reading policy to see this spike in
3 zeros. But that only applies to film badges.
4 That doesn't tell us anything at all about
5 what they did with internal. So I don't know
6 if you would expect to see a spike in zeros or
7 not. I don't know.

8 **MR. PRESLEY:** You'd almost have to have the
9 same number. You'd have to be looking at the
10 same people, wouldn't you?

11 **MR. BUCHANAN (by Telephone):** What I was
12 thinking is if you had an overall increase in
13 the internal dose not being monitored during
14 '69 and '70, that might lend itself to say,
15 okay, we didn't have people in radiation areas
16 so we weren't badging them where we had a lot
17 of zeros. Internal monitoring remained a
18 constant from '68, '69, '70, '71 and such,
19 then we'd say, well, these people were being
20 monitored internally so that we know they were
21 probably working in radiation areas is what I
22 was thinking.

23 It might help us sort out whether
24 these people were not badged but had about the
25 same jobs or whether they had different jobs

1 during this period of '69 and '70. And
2 internal dose would show a difference during
3 those two years also if they had a change in
4 function.

5 **MR. GRIFFON:** I think I would leave that as
6 a suggestion for SC&A to consider in how they
7 answer the question of the '69, you know. I'm
8 not sure it's going to be definitive though,
9 that's my --

10 **DR. NETON:** This is Jim Neton. I think if
11 they took people off external monitoring at
12 the uranium facilities is my understanding
13 because the dose potential was low for
14 external. But as we learned at Y-12, the
15 internal potential was really the hazard from
16 working with uranium. And so it would be
17 totally consistent to have a routine
18 monitoring for internal continual all along
19 and drop the external, and wouldn't really
20 tell you anything.

21 **MR. GRIFFON:** At least it could be, so it's
22 not definitive.

23 **DR. NETON:** Wouldn't cut it one way or the
24 other I don't think.

25 **MR. GRIFFON:** I think it might be

1 inconclusive but I'll leave that to, you know,
2 in your response if you want to consider that
3 suggestion. I don't think it, at least in my
4 view, I don't think it's an action right now.

5 **MS. DeMERS (by Telephone):** This is Kathy.
6 In my X-2 Table that I have in the 1969
7 report, I did give you a yes or no answer as
8 to whether they were monitored May 11th through
9 the end of '69 both in vitro and in vivo.

10 **MR. GRIFFON:** Okay, so maybe consider that
11 table that SC&A's provided. Thank you, Kathy.

12 **COWORKER MODELS**

13 Okay, can we move to item three,
14 realizing that we're in the afternoon crunch
15 as usual. I do want to stick to closing by
16 5:00, really. I know a lot of people have
17 planes to catch, and it is a Friday.

18 So we've got coworker models here, and
19 I think, and I'm not sure how far we can go on
20 this, but it comes up in, the way I bring it
21 up here is in the context of the data
22 completeness related to the two prior items
23 and Brant alluded to this a little bit with
24 the quarterly badging question and the
25 possibility of looking into that and maybe

1 modifying the coworker model, not committing
2 to it as you said, but the possibility.

3 But the question of why it was here on
4 the agenda was basically to say, you know, and
5 I don't think we're really here yet because we
6 don't have, you haven't had a chance to fully
7 investigate all of SC&A's report. But if
8 there were gaps, as it was raised before in
9 the meetings I think Jim brought this up, too,
10 that if, in fact, we do find these blanks or
11 gaps and do the coworker models or can the
12 coworker models adequately account for that or
13 be used to reconstruct doses for those gaps.
14 And I think we were thinking both internal and
15 external so I just put coworker models here.

16 The other reason I bring this up here
17 is this question of pedigree that I've brought
18 up through numerous meetings of the discussion
19 of the coworker models and the HIS-20 versus
20 the CER and then we have this question, and
21 I'm not sure we're ready to discuss this
22 because you're still reviewing these other
23 reports, but the question of if you have
24 blanks that were turned into zeros it raises
25 some questions, at least in my mind, of how

1 good is this database. How reliable is this
2 database for use as coworker models.

3 Now we have analyzed this in several
4 different ways. You've looked at CER versus
5 HIS-20 and basically on the internal side you
6 gave us a report that concluded that the
7 intakes would be very similar, equivalent, I
8 guess, over all years. So that that was sort
9 of a bottom line question was even if there's
10 differences, the bottom line is we get similar
11 intakes.

12 We also have the Donna Cragle
13 analysis, and I'm laying these things out so
14 that as we go forward we address these. That
15 report, that Donna Cragle analysis, that
16 looked into the question of CER versus HIS-20,
17 and to me, this raised a problem in my mind
18 when you look down the years and there's a
19 table in that report that says the data over
20 each year and how, and I originally in the
21 matrix defined it as large discrepancies. I
22 think there are some pretty large
23 discrepancies in a number of data points just
24 looking at the number of data points.

25 And so the question is if you're

1 missing two or three thousand data points, but
2 at the end of the day the intakes are the
3 same, I think we need to look at that closer I
4 guess is my challenge going forward as we
5 consider the data completeness if we realize
6 the coworker models are going to be into play
7 more significantly for the Rocky claimants, I
8 think we need to consider those pieces again
9 and make sure that we're comfortable with
10 them. You know, SC&A but also ultimately the
11 Board I guess, that we're comfortable that
12 they're going to be adequate.

13 And I think there's a lot of ins and
14 outs on this. I'm not sure. I'm trying to
15 remember the original analysis, but the,
16 comparing the CER and the HIS-20 when it
17 concluded that the intakes were the same, I
18 think we want to see what exactly, you know,
19 maybe look closer at that and see what exactly
20 that --

21 **MR. FITZGERALD:** And we haven't done that
22 yet.

23 **MR. GRIFFON:** Right, right, I don't think
24 that SC&A dug into that.

25 **MR. FITZGERALD:** No.

1 **MR. GRIFFON:** And it's important to again
2 emphasize the history of this that we kind of
3 didn't look into the coworker model so
4 strongly because we were basically under the
5 impression that very few claimants were going
6 to require coworker models to reconstruct
7 their dose. So I think this is kind of queued
8 up depending on the completeness analysis, and
9 also depending on, I mean, I have kind of a
10 follow-up question for NIOSH.

11 I think that since these TIBs have
12 been published, the coworker TIBs, I think
13 you've indicated that there were probably more
14 claimants that might require at least partial
15 use of these coworker models. And I don't
16 know if you have any sense of, because when we
17 first talked it was a very small fraction that
18 we thought, and now I think that might have
19 changed or shifted or whatever.

20 Do you have any sense now of, you
21 know, because if it's very few out of 1,100 or
22 how many ever claimants, then I think we have
23 to weigh this differently than if it's a lot,
24 right?

25 **DR. ULSH:** I can't give you exact numbers,

1 Mark. But what I can tell you is that, you
2 know, and we talked, I don't know, middle of
3 last year at some point. I think at that time
4 we only had just a couple, maybe two or
5 something like that cases on hold because they
6 needed coworker data to finish them.

7 Now subsequent, and what I said at
8 that time was that, at least I think I said it
9 at that time, was that the need for coworker
10 data at Rocky Flats is not zero, but it's
11 minimal compared to what you see at other
12 sites based on what we've seen so far. Now we
13 were only 700 out of a thousand cases.

14 But subsequent to that the TIBs were
15 published, the coworker TIBs, and what we have
16 indicated is that after the publication of
17 those TIBs, it's not necessarily that the
18 claims require the coworker data, it's just
19 that that might be the easiest way to do it.
20 Now there might be other approaches available,
21 but since the coworker TIB is available, and
22 it's easy to use, we use it.

23 So I can pretty much say with
24 confidence that the amount that those TIBs
25 have been, the coworker data has been used has

1 gone up since publication of the TIBs. I
2 still don't think that it's a major usage
3 compared, when you compare like to other
4 sites, but I don't have the numbers for that.
5 I can get those kind of numbers for you.

6 **MS. MUNN:** Mark, I'm not sure that I
7 understand exactly what you're asking here
8 with respect to, I had been under the
9 impression that once we had the new procedures
10 put together that we were pretty close to some
11 sort of usable data having compared these two
12 databases and knowing where there were any
13 discrepancies that we could move over from
14 there. But am I understanding that you're
15 asking SC&A to do something specific now with
16 this data comparison? And if so, I guess I
17 need some clarification here.

18 **MR. GRIFFON:** I'm asking SC&A, I don't
19 think, I think we had that deliverable with
20 the analysis that concluded that the intakes
21 from CER and HIS-20 were essentially the same.

22 **MR. FITZGERALD:** That was Joyce's work on
23 the model cases that were --

24 **MR. GRIFFON:** No, no, no, that was --

25 **DR. MAKHIJANI:** That was NIOSH.

1 **MR. GRIFFON:** That was Lockamy's, and I'm
2 asking for them to, I don't think that you've
3 ever reviewed that specifically.

4 **MR. FITZGERALD:** No.

5 **MR. GRIFFON:** And I think we kind of let
6 that go, and we've just, it's been brought up
7 again, and I just want to make sure that we
8 all are in agreement with that conclusion
9 that, in fact, you know, and also, it's not so
10 much, I think we've been through the coworker
11 models, and I think SC&A's pretty comfortable
12 with the model itself.

13 Now the question is the data that went
14 into the model, so the construct they're
15 comfortable with, I think, it's the data,
16 whether the data is, you know, this goes back
17 to this data completeness, data reliability
18 question. This question that Arjun raised
19 about blanks being put in as zeros. That
20 certainly skews your data. And then on the
21 other hand the use of the coworker model. How
22 is it being used, implemented?

23 That gets back to things that Jim
24 brings up like are you, the 95th can bound, you
25 know, but I don't know that, so if they're

1 using the 95th in most cases then we'll
2 probably, you know, we have one level of
3 comfort. If you start using the median, then
4 you're worried about these zeros probably a
5 little more. I mean, there's a bunch of sub-
6 questions there, I guess.

7 **MR. FITZGERALD:** Where they're coming at it
8 from, I think you described it pretty well,
9 coming at it from three different directions.
10 Certainly looking at the concept itself, how
11 the model's constructed. We had quite a bit
12 of discussions on OTIB-38, internal for
13 example. I think we've satisfied that issue.
14 We're pretty far along on OTIB-58 with what
15 Ron's been doing with ORAU.

16 The other aspect is we're looking at
17 the completeness issue which is kind of catch
18 me up to the coworker review because again, we
19 have to look at that first before we can judge
20 that. Certainly, we talked about that.

21 The third one we talk about in terms
22 of application. Now you've got this model,
23 you know, how's it going to be applied. And
24 we've actually got into that a fair amount. I
25 think we had discussions on an issue-specific

1 call that dealt with OTIB-38 and how it could
2 be applied, question at 95th percentile, issues
3 like that.

4 But we're also looking at questions
5 such as, but on the application side I think
6 we have started looking into that, had
7 discussions on how the models would be
8 applied. And certainly one issue since we now
9 have, had OTIB-49, high fired, you know, how
10 would OTIB-38 apply, certainly, in those cases
11 as well. So we'll look at the application.
12 Those are the three facets.

13 **MS. MUNN:** So for my benefit I guess what
14 I'm trying to do is get my intellectual arms,
15 as short as they are, around how large this
16 issue is because I have some concern about
17 this size, the magnitude, of the task we're
18 asking SC&A to perform here at this point in
19 our deliberations. I just --

20 **MR. GRIFFON:** Well, right now I think it's
21 to review a report that was on the table a
22 long time ago, but they didn't, but we sort of
23 didn't say, it wasn't a pressing action at
24 that time.

25 **MS. MUNN:** So you don't see this as a big

1 thing?

2 **MR. GRIFFON:** No.

3 **MR. FITZGERALD:** Well, it's at the point now
4 actually, we've been working at this for
5 awhile on these other fronts, but we haven't
6 looked at that specific question, and we
7 haven't quite finished up with some of these
8 others. But really, we've looked at the
9 construct. We've looked at the data
10 completeness. So we're pretty far along.
11 This doesn't represent a new avenue per se.

12 **MS. MUNN:** So we really wouldn't be
13 expecting this to be a long-term problem for
14 you?

15 **MR. FITZGERALD:** No.

16 **MS. MUNN:** It's an issue that we can hear
17 back on fairly soon?

18 **MR. FITZGERALD:** I would think so, yes.
19 This isn't the first time we've looked at HIS-
20 20 and CER, but we did it in the context of
21 what work that Joyce has been doing. So we
22 need to look at it a little broader than that.

23 **MR. GRIFFON:** I guess for me, you know,
24 another troubling piece of this for me is that
25 if you, I mean, every time I seem to look at

1 this I find discrepancies between these two
2 databases, and not one or two or 20 or 30 data
3 points. It's extensive. And to me you start
4 to wonder. I wonder about the validity of
5 either one. And we're looking at it saying,
6 okay, we're getting a similar result at the
7 end of the day so don't worry about it, you
8 know? It makes me a little uneasy of being
9 struck down.

10 **MS. MUNN:** I guess the basic question still
11 hasn't changed. The question is still how
12 good is good enough. Because certainly we're
13 not ever going to get absolute correlation
14 between any two databases anywhere as long as
15 this --

16 **MR. GRIFFON:** This is a half full and half
17 empty issue.

18 **MS. MUNN:** Yes, it is. It is.

19 **MR. GRIFFON:** How bad is too bad. That's
20 the other side of it. And I mean, I just,
21 again, I've looked at some of this. Some of
22 this comes up in the log book review. I
23 looked into some exposure IDs that come out of
24 the log book analysis, and when you track them
25 back, I almost found like every time I was

1 finding exposure ID in the 100,000 series that
2 didn't exist in HIS-20.

3 So this is very odd. It seems like
4 trends like this keep popping up, and it's not
5 one or two individuals. I did a little mini-
6 analysis looking at how many exposure IDs,
7 NIOSH provided us with a spreadsheet with
8 exposure IDs for individuals so that we can
9 link that to the ACCESS HIS-20 database.

10 And if you compare, you know, I just
11 saw this, and this is, again, no scientific
12 sampling method, but I just sort of saw this
13 trend of individuals I was finding in the log
14 books with six-digit IDs starting one-zero-
15 zero-zero-zero. And when I looked, they just
16 weren't in HIS-20. So then I said, well, how
17 many individuals are in the exposure ID Excel
18 sheet versus how many are in the ACCESS
19 database. And it seems like there's about 15
20 percent as many in HIS-20 as were in the
21 exposure IDs.

22 Now maybe there's a good reason for
23 that. Maybe those people were not in the
24 plutonium areas or whatever. It certainly
25 wasn't by year as far as I can tell. But

1 again, it's just this, you know, adding up
2 these pieces when you have these kinds of
3 discrepancies in the data it just makes me a
4 little uneasy. And that's why I'm saying at
5 least one sub-test for me I think is for us,
6 we need to go back to that old report that we
7 kind of went past in a work group meeting and
8 --

9 **DR. NETON:** Well, there's two things, Mark,
10 one is you're talking about comparing the CEDR
11 and the HIS-20 for comparability of film sets
12 to internal intakes.

13 **MR. GRIFFON:** Yeah.

14 **DR. NETON:** But then I think, I know Brant
15 and I had talked, and he had done an analysis
16 where similar to what was requested for us to
17 do at Y-12. He went back and looked at the
18 environmental reports from the health physics
19 monthly reports. He compared the numbers, and
20 I haven't looked at it for awhile, but I
21 thought it was a pretty good comparison so at
22 least the numbers that were being reported in
23 the monthly reports were matching up with what
24 was in HIS-20. And I think we better take a
25 look at that and see --

1 **MR. GRIFFON:** Yes, and he just told me
2 about, I think I didn't get that e-mail for
3 whatever reason, but --

4 **DR. NETON:** There were some discrepancies,
5 but I think it would be useful to look at.

6 **DR. ULSH:** What I found was that --

7 **MR. GRIFFON:** That would be useful to look
8 at though because that's what helped us in Y-
9 12 was looking at that summary sort of --

10 **DR. NETON:** We did that in Y-12 and it
11 seemed to satisfy people a little bit. Let's
12 go down that path.

13 **DR. ULSH:** Jim, I haven't looked at it
14 probably since the last time you looked at it
15 but just going from memory, just to summarize
16 what was there, it started, the progress
17 reports that I had covered the timeframe 1952
18 up to 1971, I believe. Again, all of this is
19 approximate because I'm going from memory.

20 There was one year in that period
21 where I didn't have the progress reports, so I
22 didn't do an analysis for that year. There
23 was another year where I had the monthly
24 progress reports for January through November
25 so I, there was another year where I had the

1 progress reports for January through November.
2 I was missing December so I made an
3 extrapolation there. With those caveats I
4 think what I saw was that the average
5 difference between a number of bioassay points
6 in CEDR versus the monthly progress reports
7 was about five percent. They were within five
8 percent of each other.

9 **MR. GRIFFON:** Of CEDR versus the monthly
10 progress or HIS-20?

11 **DR. ULSH:** CEDR versus the monthly progress.
12 No, CEDR versus the monthly progress reports
13 because recall --

14 **MR. GRIFFON:** Because you were using CEDR,
15 right, for your --

16 **DR. ULSH:** Well, yes, that's one reason.
17 But the other reason is that we know that in
18 HIS-20 some individuals' data is not in HIS-20
19 because they terminated employment prior to
20 '77. That issue is there. So what I saw with
21 the CEDR, you know, I don't want to make too
22 much of this comparison. I mean, you can't go
23 beyond what the bounds of the data are, but
24 over that time period there's very good
25 agreement, at least I think there's very good

1 agreement, within five percent on average,
2 between CER and the progress reports. Now
3 that's an average over the years, but I will
4 send that report out to you again and
5 hopefully that can go partway towards --

6 **MR. GRIFFON:** And the entire work group I
7 guess.

8 Did you get the e-mail?

9 **DR. ULSH:** I don't remember when I sent it.
10 It wasn't recently. It was at least a couple
11 of weeks or maybe more.

12 **MR. GRIFFON:** At any rate that's a new piece
13 of information. So that's helpful. I mean,
14 any prong we can come at to answer this
15 question I think is helpful. I think we're
16 down to a weight of the evidence. We've got
17 some discrepancies, but how bad are they or
18 how small are they, and can they be overcome
19 by the fact that we have some assurance that
20 the, you know, it won't affect the intake
21 estimates or things like that, the bottom line
22 sort of thing. So if SC&A can look at both
23 this report that Brant's discussing and that
24 prior report by Lockamy, the earlier report, I
25 think that would be helpful.

1 **MR. FITZGERALD:** Do you recall if the
2 Lockamy report had the spreadsheets or the
3 background stuff associated with it or not?
4 But that might be something.

5 **DR. ULSH:** I'm not sure what you mean in
6 terms of --

7 **MR. FITZGERALD:** The Lockamy report itself.

8 **DR. ULSH:** Yeah, I know that, but what --

9 **MR. FITZGERALD:** In terms of the back, the
10 supporting data.

11 **MR. GRIFFON:** Did he have his analysis in
12 there or was it just a summary of what he --

13 **MR. FITZGERALD:** I recall the analysis
14 itself.

15 **DR. ULSH:** I'll have to go on the O drive
16 and look because there's a folder here for
17 that.

18 **DR. LIPSZTEIN (by Telephone):** Let me just
19 say something?

20 **MR. GRIFFON:** Yeah, Joyce, go ahead.

21 **DR. LIPSZTEIN (by Telephone):** I think,
22 well, first of all two things. One, we are
23 going to the 95th percentile, and I think we
24 favor any of the possible problems,
25 uncertainties that we have (unintelligible).

1 And other thing is that this is a model for
2 like for example, there was (unintelligible).
3 It's just one intake rate from '52 to '61, and
4 of course, there's a big difference between
5 one year and another year, like for example
6 from the first year to the second year there
7 are three times difference from the intake.
8 The intake is what's calculated in those
9 years. They have a lot of difference from one
10 year to the other.

11 **MR. GRIFFON:** But Joyce, I think this
12 comparison document that we're talking about,
13 I think he looked at year by year. I think
14 there's enough --

15 **DR. LIPSZTEIN (by Telephone):** This is year
16 by year, but when they come to the model, it's
17 a model, so it's just one intake for ten
18 years. Then there's another intake that was
19 calculated for seven years. So --

20 **MR. GRIFFON:** But I thought the application
21 was that --

22 **DR. LIPSZTEIN (by Telephone):** What I mean
23 is that some uncertainties on the database
24 wouldn't make too much difference in a model
25 like that, but I think it's acceptable when we

1 go to the 95th percentile.

2 **MR. GRIFFON:** When you're at the 95th, right.

3 **DR. LIPSZTEIN (by Telephone):** Because, you
4 know, it's not exact anyway. You know, it's a
5 lot of estimation. Imagine just one intake
6 for ten years.

7 **MR. GRIFFON:** Yeah, I think, I know what
8 you're saying, Joyce. I think we should at
9 least look at that prior piece though and look
10 at the --

11 **DR. LIPSZTEIN (by Telephone):** Okay, okay.

12 **MR. GRIFFON:** And I think this Health and
13 Safety Report thing might be very helpful,
14 too. Did that have internal and external or
15 just --

16 **DR. ULSH:** No, just bioassay.

17 **MR. GRIFFON:** Just bioassay, okay, just
18 curious.

19 **MS. MUNN:** But there's such a wealth of data
20 here that it's hard to imagine in light of no
21 evidence of programmatic error that we can't
22 resolve this.

23 **MR. GRIFFON:** That's why we're following
24 this up because we've got the, at least
25 potential that some blanks were zeroed out in

1 the database. So that's evidence of
2 programmatic problems. I'm not saying
3 intentional or otherwise. I'm just saying,
4 you know.

5 **MS. MUNN:** Yeah, but if you're constructing
6 a dose then, well, that's --

7 **MR. GRIFFON:** I'm not saying it's
8 insurmountable either. I'm not, but I think
9 we're, all I'm saying if we can be looking at
10 these things in parallel, SC&A can look at
11 that while NIOSH is finishing their data
12 completeness response, then at the next
13 meeting we'll be ready to maybe discuss and
14 the application of those coworker, you know,
15 whether they're okay and if SC&A has any input
16 on how they should be applied, you know, that
17 sort of thing.

18 **DR. MAKHIJANI:** I have a question on this
19 one number, the 95 percentile for all years.
20 What happens if a worker worked for just one
21 year? What do you do with that in terms of a
22 claimant favorable number? And if he happened
23 to have worked in the years where he had --

24 **DR. NETON:** He would get the intake for that
25 one year, but if you're asking what Joyce is

1 alluding to which is these differences, I
2 don't know.

3 **DR. MAKHIJANI:** Would you use the number for
4 that year or would you use the same coworker
5 model number that you're using for one number
6 for ten years?

7 **MR. GRIFFON:** This is sort of an application
8 question?

9 **DR. NETON:** Mutty Sharfi might know.

10 **MR. SHARFI:** Then you'd likely go back to
11 the raw coworker bioassay data and then
12 construct its own coworker intake rate based
13 off the coworker bioassay data. You wouldn't
14 use those broad long-term periods.

15 **MR. GRIFFON:** The one year that they were
16 employed, right?

17 **MR. SHARFI:** You would look at the more
18 refined periods.

19 **MR. GRIFFON:** Seems to make sense.

20 **MR. SHARFI:** You can refine the coworker
21 intake numbers to fit the specific case
22 scenario.

23 **DR. MAKHIJANI:** Oh, great, okay.

24 **MR. SHARFI:** You're not locked into those
25 numbers.

1 **DR. LIPSZTEIN (by Telephone):** That's not
2 what's said on OTIB-028. Actually, it states
3 that but I can't --

4 **MR. GRIFFON:** Well, wait, I think we're
5 getting into the application question. We can
6 talk about this more. I don't think right now
7 is the place, Joyce.

8 **DR. LIPSZTEIN (by Telephone):** Okay.

9 **MR. GRIFFON:** I think the sense I had was
10 that the application is you use that broader
11 average and then you have sort of an if-then
12 tree. And then you might go back to the
13 annual data if you need to, right.

14 **MR. SHARFI:** That's why the tables are
15 provided in the appendix of the OTIB is that
16 if you need a more specific for the case you
17 can.

18 **MR. GRIFFON:** Then you go annual, right.

19 **MR. FITZGERALD:** Say you had a number of
20 questions that sort of get into how would you
21 apply it because I think that's a --

22 **MR. GRIFFON:** Application question, yeah.

23 So I mean, I think we're there on the
24 actions we need on the coworker stuff and that
25 may be very helpful, the latest report.

1 **MR. FITZGERALD:** And I think these are
2 pretty narrowly defined, and I think we can
3 again get that.

4 **OTHER RADIONUCLIDES - THORIUM**

5 **MR. GRIFFON:** I think we're on to item four,
6 thorium, other radionuclides, thorium, I think
7 is what we're down to. And I know that there
8 was a technical call in between meetings, and
9 I apologize for not having that in my
10 Blackberry and missing it. But anyway --

11 **DR. MAKHIJANI:** Do you have the minutes from
12 that?

13 **MR. GRIFFON:** Yes, the minutes were sent
14 around to, I think, you got those as well,
15 Wanda?

16 **MS. MUNN:** Yes.

17 **MR. GRIFFON:** So anyway you can summarize
18 where, Arjun or Brant? I don't know who wants
19 to start.

20 **DR. ULSH:** As Mark mentioned we did have a
21 conference call about a week and a half, two
22 weeks ago, something like that, on thorium
23 issues. Just to bring you up to date with
24 where we are, you know, we've been looking at
25 the thorium issue for months now I think. The

1 latest document that we've put out was
2 December 27th, and after that SC&A issued some
3 comments and evaluation of that report. That
4 was in early January along with the others I
5 think. The topic of the conference call,
6 there were two main topics.

7 The first was the question of
8 magnesium alloy which contained up to three
9 percent thorium according to the workers who
10 were involved. There's a long story involved
11 with this and it pulls in another site, the
12 Dow Madison site in Illinois. I was going to
13 say Wisconsin, but it's Illinois.

14 And there's an active SEC petition at
15 that site, and there were some interviews
16 conducted not by NIOSH but by some of the
17 petitioners involved in that site with Dow
18 Madison workers. And there was a question
19 brought up about, well, first of all it was
20 whether or not thorium was shipped from the
21 Dow Madison site to Rocky Flats and/or vice
22 versa. We later clarified that we were
23 talking really about magnesium-thorium alloy.

24 And the Dow Madison worker who talked
25 about this said it was up to three percent.

1 And there's still some questions I think, at
2 least there were at the time of our conference
3 call, about to what extent this might have
4 occurred.

5 We presented at the conference call, I
6 think we sent out the interview notes after
7 the conference call, but we talked to four or
8 five, I don't remember which, Rocky Flats
9 workers, and they did not recall large uses of
10 magnesium-thorium alloy at Rocky Flats.

11 They did recall one specific use of
12 the magnesium alloy, and it wasn't clear
13 whether it was magnesium thorium or not. And
14 that was in the pennates (ph) in the conveyor
15 line in Building 776, I believe, the one where
16 the Mother's Day fire occurred. That was it.
17 That was the only big use of magnesium alloy
18 that they were aware of.

19 And I should qualify that. It's not
20 big, but we're talking about maybe a couple of
21 hundred pounds according to one worker's
22 estimate. That was really it. I mean, we
23 didn't see, the workers didn't recall any
24 program, large scale program to use magnesium
25 alloy at Rocky.

1 Let me see, I'm trying to think of all
2 the other developments that have occurred. We
3 have since learned, we've received some
4 documentation that tells us the source of the
5 thorium that came into Dow Madison. It was
6 from Canada, and that was with pellets.
7 Ingots came from England I think is what the
8 workers said, and we see nothing to dispute
9 that. So it doesn't look like the source of
10 the thorium going into Dow Madison was Rocky
11 Flats.

12 But that doesn't speak to the question
13 of whether or not the destination was Rocky
14 Flats. Again, the four workers that we've
15 talked to, and these are folks who were
16 involved with the Operations Board at Rocky
17 Flats. I might have the names of those
18 committees wrong, and I don't know, maybe you
19 can correct me on that.

20 But the folks that were in charge of
21 all shipments of radioactive materials that
22 came into the site and then also the
23 Operations Committee, they didn't have any
24 recollection of large scale use of magnesium-
25 thorium alloy at Rocky. And in terms of the

1 pennates that they did know about, they did
2 state specifically that those were prepared by
3 an outside vendor and delivered to Rocky
4 Flats.

5 So that was one issue. I think that's
6 pretty much where we left it. We were going
7 to get the notes to SC&A, and we've done that.
8 And that's pretty much where we left that
9 issue on the conference call.

10 Now, Arjun, do you want to talk about
11 that before I move on to the other topic?

12 **DR. MAKHIJANI:** Yeah, I have the same
13 document that you have, I think, regarding the
14 thorium pellet supply from Canada. I just
15 wanted to note that in the amount of thorium
16 we had at Dow Madison for this alloy program
17 was quite large, 80 tons up to 1960. So that
18 would mean we got about 2,400 tons of alloy,
19 three percent thorium. So they were
20 fabricating making the alloy on a very large
21 scale at Dow Madison. Of course, we don't
22 know where it went, but as I understand, I was
23 talking to Tony at lunch about whether they
24 did fabrication of things, you know, like
25 trays and other parts at Rocky Flats. And I

1 do understand that ad hoc or custom parts were
2 fabricated at Rocky Flats.

3 Correct me if I'm wrong, Tony, or
4 misinterpreting our conversation.

5 **MR. DEMAIORI:** No, absolutely, we did a lot
6 of fabrications at Rocky Flats. We built our
7 own part carts with the lead shelvings. We
8 used stainless. We used all kinds of
9 different materials. We had our own
10 fabrication baths for the trucks to ship the
11 nuclear components themselves. I mean, we
12 armed them. We put the bulletproof glass in
13 them. We did all that. We had the hobby shop
14 where they did some secret fabrications in
15 there.

16 This issue of thorium, as a rad tech I
17 can tell you that we had thorium in almost
18 every toolbox on the plant site, that's in the
19 way of welding rods. So welders commonly use
20 thorium rods for the different welds that they
21 were making. You know, pretty much we did our
22 own thing, but yeah, we did a lot of
23 fabrication out at Rocky Flats.

24 Now when I was there, and that was
25 late '70s, 1979 and on, it was mostly

1 stainless steel because it was very acid
2 resistant. But we definitely built our own
3 carts and did that sort of thing. We built a
4 lot of things that they used at Rocky Flats.
5 And so, you know, I don't know on this
6 magnesium-thorium alloy, but I can find out.
7 I know a lot of machinists that would do the
8 fabrication, and you know, I can definitely
9 check into that.

10 The people who did the shipping and
11 receiving, as far as shipping and receiving
12 went, we got a lot of things into Rocky Flats
13 that we didn't expect to get. Talk about
14 americium (unintelligible) all the salts from
15 the United Kingdom were extremely hot. So
16 nothing is perfect, but I can definitely tell
17 you that we did a lot of fabrication out at
18 Rocky Flats. That's all of our research and
19 development, 779, on the hot side, and then we
20 would take 887 on the cold side. They did all
21 the beryllium operations, all the R&D for
22 that. We fabricated everything.

23 **MR. ELLIOTT:** But the numbers that Arjun
24 quoted on thorium production at Dow Madison,
25 we know, I think it's a common understanding

1 here that Dow Madison had other work, large
2 thorium commercial component that they
3 performed. And much of that was dedicated to
4 Department of Defense effort. So I'm only
5 concerned here about what we can say about the
6 production for the AEC portion and where that
7 went. I don't want to get the two confused.

8 **DR. MAKHIJANI:** No, I don't want to get them
9 confused, and it is correct that the documents
10 that you sent to Senator Salazar's office,
11 which I have here, they do indicate that
12 magnesium-thorium alloy was I guess in large
13 measure, in some measure at least, being
14 considered for like aircraft parts and things
15 like that. And the other document we have
16 about thorium-magnesium alloy, the NUREG-1414
17 also said the same thing, that that was --
18 1770, sorry -- so I would agree with that.
19 It's just the extent, my only question, reason
20 for raising that is the extent of use at Rocky
21 Flats is, well, based on the recollection of
22 talking to a few people. And there's not a
23 definitive trail of what happened when it
24 started, when it stopped, how much, and most
25 importantly, whether it was, there was any

1 fabrication work there. We understand from
2 these claimants that there was no, they were
3 not fabricated on site.

4 **DR. NETON:** We don't even know that material
5 was shipped to Rocky Flats from Dow Madison.
6 That's not a foregone conclusion. I mean,
7 that's speculation.

8 **MR. ELLIOTT:** We have no indication in the
9 documentation that we have obtained from DOE
10 thus far there was any transfer of thorium-
11 magnesium alloy from Dow Madison and Rocky
12 Flats. We haven't seen that.

13 **DR. NETON:** I'm just wondering if we're
14 chasing down something that might not have
15 happened. I mean, I think we just need to
16 establish the material was actually shipped
17 there before we start --

18 **MR. ELLIOTT:** We don't doubt that there was
19 fabrication at Rocky Flats, but I don't
20 believe we have any indication that says the
21 processes at Rocky Flats required fabrication
22 of thorium-based metal parts or et cetera. So
23 we're still interested in understanding how
24 thorium may have been introduced in the site.
25 But to date we have no indication in the

1 documentation we have that there's a large
2 thorium component here.

3 **DR. NETON:** Thorium alloy, component
4 magnesium-thorium alloy.

5 **DR. MAKHIJANI:** Yeah, there obviously was
6 some thorium alloy at, in the form of welding
7 rods now --

8 **MR. DEMAIORI:** Oh, absolutely.

9 **DR. MAKHIJANI:** -- in the form of magnesium-
10 thorium alloy. There was some presence at
11 least according to interviews that you've
12 done.

13 **DR. ULSH:** There was magnesium alloy
14 present. We don't know if it was magnesium
15 thorium.

16 **DR. NETON:** And that was manufactured off
17 site.

18 **DR. MAKHIJANI:** I didn't understand that
19 from our conference call. I thought that your
20 reference to magnesium alloy was magnesium-
21 thorium alloy, from our conference call.

22 **DR. ULSH:** Here's the minutes. All* also
23 stated that magnesium alloy was used in the
24 Building 776 line. The pennates were made of
25 magnesium alloy. Now we don't know whether

1 that was magnesium-thorium alloy. It was
2 magnesium alloy. We also know from the chem-
3 risk report, task one, that went through an
4 extensive list of like 300 pages, I think, of
5 all the chemicals and all of the materials on
6 site.

7 They talked about magnesium in terms
8 of magnesium salts and small quantity of
9 magnesium alloy. Now it's not clear whether
10 it's magnesium thorium, just magnesium alloy,
11 0.5 kilograms in the chem-risk report. And
12 that was at that time. So this was not
13 identified in the chem-risk report as a
14 material of concern.

15 And then we have the testimony from
16 the four workers, which this actually came up
17 I think at the last working group meeting.
18 And what we committed to do or what we were
19 asked to do was to go, Mel suggested that he
20 would go talk to these folks, and that's what
21 he did. He told us that they had no
22 recollection of, certainly not extensive use
23 of magnesium-thorium alloy or magnesium alloy
24 at all.

25 **DR. MAKHIJANI:** I'm concerned in reviewing

1 the material unless the working group desires
2 otherwise, I mean, we've said what needs to be
3 said in terms of raising the questions about
4 the source term. And some new questions have
5 been introduced and a new source term, you
6 know, there were two items in the December
7 report.

8 And subsequent to that the 80 ton
9 ingots and the magnesium-thorium alloy, and we
10 know the 80 ton, 80 kilogram ingots, sorry
11 about that. So I don't know where, I mean
12 it's the pleasure of the working group whether
13 there's anything further to be done.

14 **MR. GRIFFON:** I think we've left it with two
15 questions kind of. One was on the source term
16 side, and the other was this question of
17 empirical models. Have empirical models be
18 developed. So on the source term side, I
19 don't know, the question on the ingots raised
20 my, I mean I guess what NIOSH concluded was
21 that the latest report that gives more
22 information on those ingots, the amounts were
23 consistent with the earlier mass balance
24 review. Is that fair?

25 **DR. ULSH:** Yes.

1 **MR. GRIFFON:** I'm trying to remember myself.

2 And then on the other side the
3 assembly, the mock-up assembly, sort of
4 operation, it seemed to be that those would
5 have been smaller uses certainly, and probably
6 less exposure generating tasks. I'm not sure.

7 **DR. ULSH:** We're still talking about that.
8 I don't want to put words in SC&A's mouth, but
9 --

10 **MR. GRIFFON:** Well, just on the source side
11 though, smaller amounts I guess.

12 **DR. ULSH:** Yes. As I mentioned in this
13 topic-specific conference call, there were two
14 major topics. One was magnesium-thorium
15 alloy, and number two was the concerns that
16 SC&A's expressed about our empirical approach
17 to estimating possible bounding thorium
18 intakes. That was topic number two. Before
19 we move on to topic number two, I guess I'd
20 like to get your feel on like what Arjun said,
21 what comes next with the magnesium alloy? Are
22 you okay with where we are? Do you want to
23 see some more specific actions? Or what's the
24 pleasure of the working group I guess.

25 **MS. MUNN:** Certainly, this working group

1 member thinks we've beaten the magnesium alloy
2 thing to death, and I see, I don't know where
3 we could go from there. It appears to me that
4 we've researched whether we did, in fact, have
5 magnesium alloys, and we've identified four
6 individuals who had total plant oversight at
7 one time or other and were part of the
8 Operations Board, all of whom would have known
9 of any extensive use of magnesium alloys.
10 They all had the same general response.
11 Unless there is some significant issue with
12 respect to magnesium-thorium alloy
13 specifically, I can't see that we can take
14 magnesium much further. It seems clear to me
15 that it's not a major issue.

16 **MR. GRIFFON:** Magnesium-thorium alloy would
17 be the question of concern. But, yeah, I
18 can't, you know, short of additional
19 information, which I don't see on the horizon,
20 I don't think there's much we can do with
21 that. And I think all the evidence, I mean,
22 from what I can see so far and this is just my
23 personal opinion right now from what I've
24 seen, is that it doesn't, you know, it looks
25 like if any was shipped we can't find any

1 evidence that there was any significant
2 fabrication or with that material at Rocky.

3 So from an exposure standpoint I don't
4 think it's worth chasing, so to speak, unless
5 other clear evidence is brought before us.
6 But I don't think there's any further action.

7 Now, Arjun, what's your sense of that?
8 It's sort of up to the work group.

9 **DR. MAKHIJANI:** Yes, it's entirely up to
10 you. We raised the question. NIOSH followed
11 up and did the expert interviews, and I think
12 --

13 **MR. GRIFFON:** So that's my feeling on the
14 magnesium-thorium alloy is that I don't know
15 that we're going to, you know, we've got some
16 statements. We've tried to check them the
17 best you could. You've come back and we don't
18 have any indication of, certainly no
19 indication of fabrication at the site and very
20 little indication of any use, and limited if
21 any use, you know. So I think we've chased
22 that about as far as we can at this point.

23 **MS. MUNN:** Pretty well documented.

24 **MR. GRIFFON:** The only other thing is maybe
25 if Tony does get back to us from talking with

1 some of the former workers that have knowledge
2 of this then that's new information before us.
3 So I think we have to address that. But short
4 of new information I think we've chased it as
5 far as we can at this point.

6 Now were you going to, I mean, on the
7 other source term side before we get into the
8 techniques for bounding, I guess on the other
9 source term side I was looking at some of the
10 Health and Safety reports as were probably
11 some of the ones you were looking at for the
12 database completeness question. In some of
13 those reports they talked about developing a
14 thorium urinalysis program.

15 And they did talk about some limited
16 air sampling data. You might have seen some
17 of these same reports. So it made me wonder
18 if any of these reports, because you've gone
19 through certainly more than I have of these,
20 if any of these reports shed further light on
21 a more extensive operation with the ingots,
22 with the rolling, with that kind of thorium
23 work.

24 **DR. ULSH:** They do shed some light on that,
25 Mark. It was in the, yeah, I think it was

1 those same progress reports that you mentioned
2 that you do see occasional mention in 1960
3 that they were attempting to develop methods
4 for thorium urinalysis. And that was in
5 advance of that ingot project in 1960 that was
6 covered in that report.

7 In fact, in our December 27th report we
8 talked about all of the thorium bioassays. It
9 was easy because there weren't many. They
10 were developing those things for the ingot
11 operation. There were a couple of individuals
12 who I think one of them wound up, they
13 concluded that he had worked in a thorium
14 refinery prior to Rocky Flats, and that's why
15 they saw, you know, I think they saw some
16 thorium in his urine.

17 **MR. GRIFFON:** Yeah, I remember that exact
18 distinction, yeah.

19 **DR. ULSH:** So that was some of the
20 urinalysis results, maybe two, three, I don't
21 know. There was another individual that came
22 up with a funny peak in his, or an unexpected
23 peak in his whole body count. Bob Bistline
24 wrote a report on that one, and it turned out
25 that it was not related to thorium.

1 And then there were a few confirmatory
2 bioassays taken related to the ingot, thorium
3 ingot project. And that was pretty much it.
4 That's all we've seen with regard to thorium
5 bioassay. So I don't think that those would
6 speak to a wider thorium use program than what
7 we've already identified.

8 **MR. GRIFFON:** And those reports where they
9 discuss the urinalysis program, those
10 timeframes are consistent with what you saw --

11 **DR. ULSH:** Yes.

12 **MR. GRIFFON:** -- as the thorium project in
13 other documentation.

14 **DR. ULSH:** The thorium project, the main
15 document that we had describing the ingot
16 project was authored by a guy named Callabra
17 (ph). He wrote an extensive report on that
18 operation, and it gave exact times of when it
19 happened.

20 And we also found notations on this
21 project in the Kittinger logs of the time. So
22 we know when that ingot project happened. It
23 happened on eight working days spread out over
24 the latter part of 1960s. And this
25 development work that you're talking about

1 where they talk about the progress reports,
2 that was earlier in 1960. They were trying to
3 develop that in advance of that project.

4 **MR. GRIFFON:** And where did this ingot
5 processing happen? What building was that in?
6 Do you recall?

7 **DR. ULSH:** Primarily in Building 881, but I
8 think they did some acid, processes that
9 involved acid. I think etching maybe in 331
10 maybe, one of the 300 buildings, 331, 334.
11 That was also laid out in the Callabra report,
12 but primarily in Building 881.

13 And we also saw, that was consistent
14 with what we saw in the chem-risk test three
15 report. It talked about the uses of thorium
16 and where it occurred. And that was
17 consistent with what was in that report as
18 well.

19 **MR. GRIFFON:** And then the assembly, the
20 mock-up assemblies?

21 **DR. ULSH:** Okay, now, that's a second
22 category of operations. So in terms of the
23 quantity of thorium that was used at Rocky,
24 that was primarily in that ingot operation.
25 They had three ingots of the dimensions, they

1 were 12 inches by 12 inches by three inches.
2 So we're talking, physically anyway, they were
3 fairly small ingots, and there were three of
4 them. That was about 240 kilograms, and
5 that's a majority of the thorium inventory
6 that we saw in ledgers at Rocky Flats.

7 Now in terms of the number of
8 operations, there were occasions when Rocky
9 Flats would receive these finished parts from
10 Oak Ridge to use in their models.

11 **MR. GRIFFON:** That was (unintelligible).

12 **DR. ULSH:** So that's a separate operation
13 there.

14 And then you had smaller uses of --

15 **MR. GRIFFON:** We don't know the extent --
16 I'm sorry to interrupt -- we don't know the
17 extent of, I mean, that one memo suggested
18 that those uses were sort of below what would
19 have been recorded on the mass balance.
20 Although Mel suggested, or Bryce, I forget who
21 had suggested, that if the building exceeded a
22 certain amount, it would have been rolled into
23 that mass balance summary. Is that accurate?
24 Am I off-base on that?

25 **DR. ULSH:** Well, you might be talking about

1 yet another, there were, I think, four uses of
2 thorium that we've identified. One was ingot.
3 Two was the use in weapons mock-ups. Three
4 was the use in laboratory standards.

5 **MR. GRIFFON:** Now I think I'm talking about
6 two, the mock-ups.

7 **DR. ULSH:** The mock-ups.

8 **MR. GRIFFON:** Where they said that they
9 would have been, I think the one paragraph in
10 that memo it was the history of thorium use, I
11 think, at Rocky Flats, in that memo.

12 **DR. ULSH:** Okay, the Bob Bistline report.

13 **MR. GRIFFON:** Yeah. And it indicated in
14 that one paragraph that currently I think it
15 said seven kilograms onsite, but it might have
16 been a 0.7. It was a blurry copy that I was
17 looking at.

18 **DR. ULSH:** Yeah, I think that was
19 cumulative, totally.

20 **MR. GRIFFON:** But anyway, it suggested that
21 earlier period would have had more but still
22 each individual use was below what would be
23 reported on these forms. I don't recall the
24 exact language. I'd have to go back to the
25 reference, but --

1 **DR. ULSH:** I don't either. I don't have
2 that in front of me.

3 **MR. GRIFFON:** My question was how extensive
4 was that operation. Are we talking about a
5 lot of small uses that when you aggregate
6 them, and how long did it go on sort of that -
7 -

8 **DR. ULSH:** Well, in order to answer that
9 definitively, in other words, we could get
10 some indirect evidence from the MDA ledgers in
11 terms of we could look at when the inventory
12 changed and get some indication of when they
13 might have received a part from Oak Ridge, and
14 when they might have sent them back. Then we
15 can, if it's the working group's pleasure,
16 then we can do that.

17 In fact that's one of the concerns I
18 think that Arjun's report talked about was
19 that we have reported inventory numbers and
20 not through-put numbers. Now what -- I did
21 not actually do this. Mel and Bryce did and
22 Mark Rolfes. What they did was they reported
23 the highest inventory for the year. In order
24 to get, and what Mark told me, he looked at
25 these ledgers, was that there were very few

1 times when the inventory actually changed.

2 But we can get those numbers if --

3 **MR. GRIFFON:** I don't know that we
4 necessarily need them. I thought maybe from
5 your interviews you can give us the scope of -
6 -

7 **DR. ULSH:** It was not, all the interviews
8 that we have conducted have indicated, number
9 one, that this was a very unusual occurrence.
10 I don't even want to hazard a number, but it
11 wasn't like an everyday occurrence. It was
12 special order work, and it was not extensive.

13 Now we have talked to, regarding these
14 uses in weapons mock-ups, we've talked to four
15 R&D machinists just recently, and we're about
16 to send out these interview notes to everyone
17 because SC&A has expressed continuing concerns
18 about how we're going to bound the dose of
19 this particular use of thorium. So we went
20 back and talked to these machinists.

21 And I think we need to be very clear
22 here that we don't confuse the machining
23 operations that occurred when the only
24 indication that we have that these parts from
25 Rocky Flats were machined was one interview

1 that we conducted with a site expert, and he
2 said the parts might have been lightly
3 trimmed.

4 **MR. GRIFFON:** Parts from Rocky Flats or from
5 Oak Ridge?

6 **DR. ULSH:** From Y-12.

7 **MR. GRIFFON:** From Y-12, you said from Rocky
8 Flats.

9 **DR. ULSH:** Oh, I'm sorry.

10 **MR. GRIFFON:** From Y-12, I'm just trying to
11 stick with it here.

12 **DR. ULSH:** Yes, they received the parts at
13 Rocky Flats from Y-12. And that individual
14 was not a machinist. He was very
15 knowledgeable at the site. He was one of the
16 people that we talked to about maybe using
17 thorium alloys. We had a general picture of
18 where things were at the site.

19 But we have talked to four R&D
20 machinists. These guys worked in Building 991
21 where this operation would have occurred, and
22 none of them could recall ever actually
23 machining these parts. I mean, the problem is
24 I can't say to you with 100 percent certainty,
25 well, they never ground off a high spot.

1 I can't say that because I don't know
2 that, but that's the only indication that we
3 have that they did anything other than take
4 them out of the box and bring them
5 (unintelligible) so far. And I think it's
6 fair to say that NIOSH and SC&A have not yet
7 reached closure on how to bound doses for that
8 particular operation. Fair enough?

9 **DR. MAKHIJANI:** Yes.

10 **MR. PRESLEY:** Are those interviews for those
11 machinists going to be seen?

12 **DR. ULSH:** I hadn't planned on it, Bob. I
13 can show them to you. I've got a hard copy
14 here. They don't go into detail, I mean, it
15 was pretty much, it was very focused. And it
16 asked do you ever recall machining these
17 parts, something like that, one question.

18 **MR. PRESLEY:** Okay.

19 **DR. ULSH:** I'll talk to you afterwards about
20 that before we send it out. If there's any
21 concern at all, we don't want to cross any
22 lines.

23 **MR. DEMAIORI:** What year was that --

24 **DR. ULSH:** The ingot operation or the parts?

25 **MR. DEMAIORI:** Parts for the machining.

1 **DR. ULSH:** I can't really tell you, Tony. I
2 don't know exactly without going back to get a
3 more detailed look at the MDA ledgers. It was
4 early on in Rocky Flats history, but I don't
5 know the exact years.

6 **MR. PRESLEY:** Late '60s.

7 **MR. GRIFFON:** Nineteen-sixties?

8 **MR. PRESLEY:** Mid-to-late '60s.

9 **MR. DEMAIORI:** Because most of the machining
10 R&D was 887. So I was just wondering. They
11 may have not built 887, you know, in the late
12 '60s. But when I was there, the bulk of the
13 R&D machining was 887.

14 **DR. ULSH:** Yeah, this is certainly in the
15 earlier years, in the '60s, maybe in the '50s.
16 I don't know exactly when. In order to answer
17 that question we would need to go back and get
18 a look at the, closer look at the MDA ledgers.

19 There were two other thorium
20 activities, thorium strikes, and what that
21 involved was some special order work that
22 Rocky Flats conducted with uranium-233. And
23 that uranium-233 had trace contaminants in the
24 beginning 50 ppm and later on down to seven
25 ppm of U-232 which daughter products of which

1 are thorium-228.

2 And so in order to work with this
3 uranium-233, they had to remove those thorium
4 daughters. And this occurred on -- well, I'm
5 looking at the chem-risk report right now.
6 Twice during the '64 to '69 time period, but
7 there were some other ones later. Again, not
8 a common occurrence but a handful of
9 occurrences.

10 And unless you look at this you may
11 not know, but there is a very great external
12 exposure hazard with this kind of an
13 operation. We have seen notations about this
14 in the Kittinger logs and describes when it
15 occurred, and that they did cover it with
16 health physics support. It was a small
17 operation in terms of the number of people
18 involved.

19 **MR. GRIFFON:** Do you have a sense of the
20 people, how --

21 **DR. ULSH:** Pardon me?

22 **MR. GRIFFON:** How many people?

23 **DR. ULSH:** A dozen at most and that's
24 probably an overestimate.

25 But they removed the thorium

1 daughters, the thorium-228, and the daughters
2 from the uranium-233 before they processed the
3 U-233. Now for those operations we have
4 proposed a NUREG-1400 approach. But again,
5 SC&A's expressed some concern about that
6 approach, and we are currently considering
7 their concerns about that.

8 And finally, we have these various
9 miscellaneous, very small uses of thorium like
10 in laboratory standards, that kind of thing.
11 I think that covers the four categories,
12 right, Arjun?

13 **DR. MAKHIJANI:** Yes.

14 **MR. FITZGERALD:** The only clarification I
15 would add, I think the way we had left it
16 because the concern was the semi-empirical
17 approach I think from our standpoint didn't
18 demonstrate conservatism necessarily, and I
19 think the response was to consider a, perhaps
20 a bounding analysis for the three activities
21 other than the ingots that were, you just
22 talked about. I think that's the way we left
23 it there at the end, and I think there was
24 some agreement that you would look at that.
25 Is that still the case?

1 **DR. ULSH:** That is the case, Joe. That's
2 the way I recall it, too. But I think it was
3 not SC&A's position that they couldn't be
4 bound. It's just that you were not yet
5 convinced with any bounding analysis that we
6 had yet presented.

7 **MR. FITZGERALD:** Yeah, I think that was it.

8 **MR. GRIFFON:** So that's an outstanding
9 action.

10 **DR. ULSH:** That is an outstanding action.

11 **MR. GRIFFON:** And what about, you said other
12 than the ingot operation?

13 **MR. FITZGERALD:** Yeah, I think we were
14 focusing, I think the conclusion of the review
15 that we presented was that we were okay with
16 the ingot operation in terms of the monitoring
17 that was done, but the other three where
18 NUREG-1400 would be essential, those were the
19 three that --

20 **MR. GRIFFON:** What is the proposal? You
21 probably told me this before, but what's the
22 method for the ingots for dose reconstruction?
23 If they were involved in that operation, how
24 do you reconstruct their dose? You have some
25 urinalysis --

1 **DR. ULSH:** We did have, okay, there was some
2 urinalysis, more confirmatory-type urinalysis
3 to show that intakes didn't occur. There was,
4 basically, our approach was to show that there
5 was no significant intake potential for that
6 job.

7 **MR. GRIFFON:** Well, that's what I wanted to,
8 the Health and Safety reports that we're both
9 looking at apparently, what I read is they do
10 have references to air sampling. And it
11 wasn't clear, obviously, we run across this
12 again, it wasn't clear. I think one was over
13 -- well, I don't want to quote numbers, but it
14 was high, but it said an operational sample so
15 it's not clear if it was in the rolling area
16 or it wasn't probably in a breathing zone.
17 Then they gave an average of for people in the
18 area I think it said, a reported number said
19 20 or 30 percent of the mpl on average for the
20 --

21 **DR. ULSH:** If we're thinking of the same air
22 sample, and I think we are, they did have the
23 location listed on the air sampling card where
24 the air samples were taken. One was taken
25 like three feet from the ingot. Another was

1 taken by --

2 **MR. GRIFFON:** Okay, I didn't see the air
3 sampling cards themselves, so maybe I --

4 **DR. ULSH:** Well, our report considered that
5 and we had the detailed analysis of the job in
6 terms of it was almost an hour-by-hour blow of
7 the whole project. So we calculated, well, we
8 felt at least, the maximum credible intakes.

9 I don't know. Arjun?

10 **DR. MAKHIJANI:** Well, we didn't evaluate the
11 question of whether there were maximum
12 credible intakes or not. We looked at the
13 documents and saw that there were air
14 monitoring data, and there were some high
15 results, did not evaluate whether they were
16 breathing, you know, they were area samples if
17 I remember correctly.

18 We haven't looked at whether the model
19 provides a conservative dose estimate, we just
20 did note that there are air monitoring data
21 and some bioassay sample data of which, and
22 the bioassay sample data probably used to
23 bound the dose with a minimum --

24 **DR. NETON:** That's pretty high because --

25 **DR. MAKHIJANI:** Just from the point of view

1 of an SEC issue, and I just want to say what
2 we did in saying the dose reconstruction is
3 feasible, but I think we know that that we
4 haven't actually examined the details of --

5 I know that there was a calculation in
6 your December 27th report, but we haven't
7 critically evaluated that calculation to sign
8 off that we would agree that that's the
9 appropriate method to use because there are
10 bioassay sample data that I think would be
11 used to bound the dose. And I think Jim Neton
12 is agreeing with that.

13 **DR. NETON:** Certainly, yeah.

14 **DR. MAKHIJANI:** Now whether the issue of
15 what should be done, and what would be
16 appropriate would be a separate task. And
17 certainly we could do that, but we haven't
18 done it.

19 **MR. GRIFFON:** I guess we get to the question
20 of do we have sufficient data that, is it
21 plausible, the bounding dose. And I think we
22 kind of stopped there, but we do have to at
23 least make that determination.

24 **DR. MAKHIJANI:** Well, I think with the
25 bioassay data being all below the minimum

1 detectable limit, you could, in principle, use
2 the minimum detectable limit for bioassay
3 dose. I don't know, Joyce is not on the line
4 so maybe --

5 **MR. GRIFFON:** And you have a lot of air
6 sampling. I mean, I've got to admit --

7 **DR. ULSH:** Not a lot.

8 **MR. GRIFFON:** -- not a lot. I shouldn't say
9 a lot, but you have some Health and Safety
10 reports indicating air sampling.

11 **MS. MUNN:** But there wasn't a lot of
12 activity going on. There wouldn't be any
13 reason for a lot of --

14 **DR. MAKHIJANI:** Well, they did have an
15 incident. Now in the third rolling they had a
16 failure and the high, if I recall correctly
17 now, I did a quick look at these documents
18 some time back. If I recall correctly, some
19 of the high air concentrations were associated
20 with that incident. And so you'd have to, in
21 order to do an assessment, you'd actually have
22 to identify those air samples, where the
23 workers were and what you would do -- now
24 they're area air samples so we will get into
25 the question of how the area air samples are

1 to be related to what the workers were
2 actually breathing, which is an argument that
3 we've had in other contexts. But it was only
4 one out of three if I recall in the other two
5 cases the air concentrations were considerably
6 lower.

7 **DR. ULSH:** They were canned. If you look at
8 the details of this operation, they took these
9 thorium ingots, and they were trying to form
10 them into shapes. And in order to do the
11 operations on these ingots, they canned them.
12 Now Arjun is correct that on that third ingot,
13 there was a can failure. They started to see
14 fractures in the joints of the can so they
15 stopped. They're done.

16 And then they had to remove that ingot
17 from the can, and that's where you saw the air
18 sampling, when they were taking the ingot out
19 of the can. And Arjun's right. I mean you're
20 both right. They did see detectable activity
21 in those. They did.

22 **DR. MAKHIJANI:** Well, there was detectable
23 activity in the air samples, in earlier air
24 samples as well, wasn't there?

25 **DR. ULSH:** There were smaller air --

1 **DR. MAKHIJANI:** I'll have to go back --

2 **MR. GRIFFON:** I mean, detectable activity, I
3 mean, I'm looking at, and I haven't seen that.
4 I know I probably haven't read through all
5 your details because you said you did a blow-
6 by-blow.

7 **DR. ULSH:** Yes.

8 **MR. GRIFFON:** I probably skimmed through
9 that. I haven't looked at it thoroughly. But
10 the one Health and Safety report says while
11 rolling coated thorium, they got a reading of
12 1332 percent of the mpl. Now I don't know if
13 that sample was 1332 percent. So that's a
14 high air sample. They go on to say routine
15 samples, and I'm not sure how they define
16 routine samples, but I would think maybe
17 something that they would assume the workers -
18 -

19 **DR. ULSH:** Are you sure it was 1332, Mark?
20 I thought it was 132.

21 **MR. GRIFFON:** Well, I have pretty shaky
22 writing, but I thought it was 1332. Anyway,
23 routinely, to on to say routine, the average
24 samples were two percent of the mpl and the
25 highest was like 10.1 percent. So obviously,

1 that might be something more related to
2 personnel exposures. I don't know. But it
3 certainly raises a question in my mind of was
4 this data being considered in any way to
5 establish your bound. It sounds like you're
6 saying that they had minimal overall potential
7 for doses, right, in this operation.

8 **DR. ULSH:** Well, maybe I should just stop
9 and say that I think we are in agreement that
10 dose could be bound. In terms of how high
11 that might be, that might be more of what John
12 would call a tractable issue that we could
13 delve into. But I mean, I think with the
14 bioassay samples and the air samples that you
15 have, you can come up with a methodology to
16 bound that should you ever come up with a
17 claimant that was involved. Now we also have
18 the names of the people that were involved in
19 this operation. That was listed in the log
20 books.

21 **MR. GRIFFON:** Okay, so you have that much
22 detail, yeah.

23 **DR. NETON:** How many bioassay samples were
24 there?

25 **MS. MUNN:** You had 18 or something like

1 that?

2 **DR. ULSH:** Something like that.

3 **DR. NETON:** Large number for a small
4 operation like that.

5 **DR. ULSH:** I think the way it was, Jim, was
6 in the progress reports I found indications of
7 like maybe 18-ish bioassay samples. And I
8 did, and then that one log book that we looked
9 at had a couple of them in there, so on the
10 order of ten to 20.

11 **DR. NETON:** It's a reasonable number, not
12 one or two.

13 **DR. MAKHIJANI:** Were there -- sorry.

14 **MS. MUNN:** No, go ahead.

15 **DR. MAKHIJANI:** Were there bioassay samples
16 after the incident? Do you remember?

17 **MR. MEYER:** Eight individuals involved in
18 the operation, urinalysis was requested, four
19 individuals identified by name in the Health
20 Physics log book were involved in that
21 specific operation and no detectable urine
22 activity was observed and maximum intakes
23 using air activity data was not of
24 consequence.

25 **DR. MAKHIJANI:** I mean, that's why when I

1 looked at, Brant, actually I'm looking at my
2 e-mail, and Brant actually had e-mailed all
3 the three references, the Kittinger logs and
4 the Callabra report. And I'm looking at them,
5 and that's probably why we signed off on this.
6 I'm trying to reconstruct what we did.

7 And so I think if you take the
8 bioassay, my bottom line on this as an SEC
9 issue would be that if you take the bioassay
10 data, and like Joyce could comment on it if
11 she has a comment, that if you take a bounding
12 dose approach, and you have bioassay data,
13 quite a number of samples for a small number
14 of workers including after the incident, then
15 you should be able to bound the dose. And so
16 it then becomes a question of what's
17 reasonable if you have a claimant rather than
18 whether it's an SEC issue. It doesn't seem to
19 me to be an SEC issue.

20 **MS. MUNN:** It doesn't seem to be a major
21 issue at all if you're reading the report as I
22 read it. It's very straightforward. The
23 fabrication of the thorium metal parts from
24 three 80 kilogram ingots, it gives you eight
25 hours of cold rolling on June 3rd. It gives

1 you the dates, 4.62 dpm per liter square,
2 approximately 30 hours of other. I mean, it's
3 very clear in the final statement here you're
4 using data from both the general report and
5 the specific data from the one can opening.
6 Excellent agreement is demonstrated as one
7 Becquerel from the single can/uncanning task
8 and three Becquerels intake from 30 hours of
9 work with all three of the ingots. The
10 calculated doses using different software
11 programs also shows consistency of resultant
12 doses less than 100 millirem to any organ. If
13 that's --

14 **MR. GRIFFON:** So you've been using the MDAs
15 of the time. The intakes were that small?

16 **DR. MAKHIJANI:** Well, no, --

17 **MR. GRIFFON:** The calculated intakes were
18 that small? That surprises me a lot.

19 **DR. MAKHIJANI:** This is how you would have
20 done the calculation back then. I think that
21 the reason for going on about thorium is if
22 you read the documents back then they weren't
23 that concerned about thorium as a radioactive
24 material in the '50s.

25 **MS. MUNN:** We know that.

1 **DR. MAKHIJANI:** And so we understand that
2 for how they viewed things then, but how we
3 view things today obviously is quite
4 different. And so that's the reason for
5 raising this as an issue is if the dose
6 reconstruction is done with today's science,
7 then we have to take the approach of today's
8 science. And then you wouldn't calculate a
9 hundred millirem dose with today's science.

10 **MS. MUNN:** But the real issue is do you have
11 data that was taken at the time that can be
12 used in today's world. And if I'm reading
13 this correctly, we have adequate data, we have
14 specific data from then.

15 **DR. MAKHIJANI:** Oh yes, Ms. Munn, that's
16 exactly why I said that especially the air
17 samples are relatively few and they would
18 raise questions about whether you could
19 adequately bound the dose. And we would be in
20 the arena of how many air samples, and where
21 was the person versus where was the sample,
22 and how long the sample was.

23 But because there are bioassay data, I
24 think it's not a question of whether the dose
25 can be bounded. Now how you would calculate

1 the dose I think --

2 **MS. MUNN:** Is something else.

3 **DR. MAKHIJANI:** -- and whether their
4 approach we would sign off on is a different
5 issue. I mean, we can address that if it's
6 your pleasure that we should do it, but my own
7 feeling is that in this context this is not --

8 **MR. GRIFFON:** No, no, I was actually re-
9 familiarizing. I didn't remember how many
10 urinalysis samples and all that. The other
11 question with these kind of situations always
12 for me is if you know the individuals
13 involved, you have identifiers and everything.

14 And that sort of answers another
15 question that I have is are you going to apply
16 this to anybody who ever went in the building?
17 Well, probably not if you know it was only
18 limited to ten or 12 or whatever number of
19 people you have specific names. You don't
20 have to broadly apply it. So I think that
21 answers another question I had in my mind.

22 But let me just, I just want to break
23 from our agenda for a second. Tony has to
24 leave, but I want to offer him the floor if
25 you had anything to say that the work group

1 hasn't seen you in a few meetings.

2 **MR. DEMAIORI:** And I'd like to apologize for
3 my early departure. I'm actually here on a
4 job for CH (inaudible) Hill, and I wasn't
5 notified of this till after I'd scheduled my
6 flight. In fact, I haven't been getting
7 notified for about six months of some of the
8 working group meetings. So that was a problem
9 that's been corrected.

10 However, I'd like to thank everybody
11 for the hard work that you're doing on behalf
12 of all the people that worked at Rocky Flats.
13 I know they really appreciate it. I know it's
14 a thankless job, and I know that everybody
15 here has worked very, very hard.

16 I would like to remind everybody that
17 there's two different ways that this world
18 actually works. There's the procedure that
19 tells you this is how you do what when. And
20 then there's what actually goes on in the
21 workplace. And sometimes they're not
22 necessarily verbatim the same.

23 To give you an example I'm a rad tech,
24 and I don't think we ever passed a nod
25 (inaudible) personnel. So I think we always

1 failed in turbo frisking, I think is the term.
2 Supposedly you frisk at one-to-two inches a
3 second. On a person it's about two minutes a
4 person. Historically, we have two people on
5 the step-off pad. We're moving three to five
6 hundred people in a 45 minute period. So
7 statistically that's impossible.

8 Not that we didn't try to do our jobs
9 and do them very well, you know, but sometimes
10 production methods, not the ideal conditions.
11 So people modify and adapt and I would just
12 hope that everybody would take that into
13 consideration when they do go over this
14 material. And that applies to all aspects. I
15 don't care if it's machining or operations or
16 dose reconstruction.

17 So I just would hope that everybody
18 would take that into their final
19 consideration. And once again thank you very
20 much. We really appreciate it. And I know
21 that unless people get exactly what they want
22 you probably won't be thanked. However, you
23 have to know that your hard work is definitely
24 appreciated at the end of the day so thank you
25 very much.

1 **MR. GRIFFON:** Thanks, Tony. We'll make
2 sure, we'll also make sure you get all these
3 pieces of the reports e-mailed to you and keep
4 you in the loop better.

5 **MR. DEMAIORI:** Yeah, I'd appreciate it.

6 **MR. GRIFFON:** I apologize for the
7 miscommunication.

8 **MR. DEMAIORI:** You know, I guess they
9 changed e-mail systems and somehow we didn't
10 get on it. However, we're there, so it's been
11 corrected.

12 **MR. GRIFFON:** Okay, thank you.

13 Let's take a quick break then. I
14 think people want a comfort break, and it's a
15 good time. Let's keep it at ten minutes
16 though because I do want to get out of here by
17 5:00. I'm still --

18 (Whereupon, a break was taken at 3:00 p.m.
19 and the meeting resumed at 3:13 p.m.)

20 **MR. GRIFFON:** We're going to reconvene, and
21 I'm not sure we wrapped up the, let's just
22 finalize thorium here for a second, and then
23 we'll move on in the agenda.

24 I'm trying to understand the question
25 of source term. I'm not sure that, unless

1 more evidence is presented to the work group
2 that we can take this source term question
3 much further. The question on the bounding
4 analysis, where do we stand with the -- excuse
5 me, somebody's on not muted there.

6 **DR. ULSH:** Hey, Jim Langsted, that's you.
7 Jim, push your mute button.

8 **MR. GRIFFON:** He can't hear us.

9 Jim. I don't know how to, he's not
10 hearing us.

11 For the meantime those on the phone,
12 I'm just going to kind of talk over. We hear
13 another voice here, but just try to talk over
14 him.

15 So the source term question is, I
16 don't think we can go much further with it as
17 far as actions unless we get more data that
18 says there's additional source term there.

19 **DR. ULSH:** When you say the source term
20 question, Mark, are you talking about
21 magnesium-thorium alloy?

22 **MR. GRIFFON:** No, I'm talking about any
23 thorium, any thorium use, period, across the
24 board. Did you have a comment on that?

25 **DR. MAKHIJANI:** The thing that Tony brought

1 up about the welding rods?

2 **MR. GRIFFON:** Yeah, I'm not, I don't know
3 the extent. I think that was pretty common at
4 a lot of DOE sites.

5 **DR. ULSH:** At a lot of sites period.

6 **MS. MUNN:** Yeah, it can't be very large. I
7 hesitate to use the word significant, but it
8 can't be, it cannot be a huge contributor.

9 **DR. MAKHIJANI:** This is discussed in NUREG-
10 1717, and the range of intakes is pretty
11 varied from small to at least not
12 insignificant if you look at NUREG-1717. So
13 while it would have probably been considered
14 as not important at the time that it was done,
15 no doubt. Again, it's the same question.
16 Until Tony told me at lunch I wasn't, it was
17 completely unanticipated. I didn't even think
18 to ask. But in the context of just asking him
19 about magnesium-thorium alloy, he brought it,
20 well, you were there. And since NUREG --

21 **MR. GRIFFON:** It's going to be a complex-
22 wide issue, if we --

23 **DR. MAKHIJANI:** This would be a complex-wide
24 issue. So I just want to raise that. It's
25 not necessarily a Rocky Flats-specific issue,

1 but since NUREG-1717 does cover it, we did
2 write about that and cite the specific numbers
3 in our report.

4 **DR. NETON:** Is this something we should add
5 to our complex-wide tracking list? It's
6 certainly not just a Rocky Flats --

7 **MR. GRIFFON:** Right, it's not just a Rocky
8 Flats, many other sites, yeah.

9 **MS. MUNN:** My thought would be we ought to
10 do that and put it to bed quickly because
11 there'll be a limited number of people who are
12 involved with it. It will affect primarily
13 individuals who did that type of work, and I
14 wouldn't be surprised if they aren't fairly
15 easy to identify.

16 **MR. MEYER:** And there are a number of good
17 peer review papers that estimate the dose from
18 that.

19 **DR. NETON:** So there's no doubt we could do
20 something with that. We just had heretofore
21 not considered that as an exposure. I'm not
22 sure all welding rods are thorium either.

23 **MS. MUNN:** No, I don't think so.

24 **MR. GRIFFON:** I guess the question would
25 also be, for Rocky Flats for now the question

1 is could we, would there be a plausible method
2 to bound, and maybe this 1717 would answer
3 that. Not that I'm saying that you would have
4 to do that, but if we think it's a significant
5 source or maybe a significant source.

6 **MR. ELLIOTT:** Well, I think you've also got
7 to look at it in conjunction with some of the
8 other TIBs we've got out there like
9 construction trades TIBs, and does the
10 construction trade TIB adequately account for
11 this kind of an exposure. I don't know.

12 **DR. NETON:** Thorium rolling rods is not
13 something that we really addressed at this
14 point.

15 **MR. ELLIOTT:** I understand that, but the
16 design, the exposure design in the
17 construction TIB gives a very conservative,
18 generous estimation of dose.

19 **DR. NETON:** But it's the separate nuclide
20 source term that we haven't really, we'd have
21 to look at it, and it's a good point. My
22 feeling is that we could certainly bound it
23 somehow. I mean, you know how much is in a
24 welding rod, and you know the estimation of
25 dose, and that's where --

1 **MR. GRIFFON:** And I think for the most part
2 you would expect a local exposure environment
3 to the welder, right?

4 **MS. MUNN:** Right.

5 **MR. GRIFFON:** I don't think we're talking
6 broad exposures to others so you could
7 probably do something where you knew job
8 titles and do --

9 **DR. MAKHIJANI:** I would tend to agree with
10 Jim. I haven't studied this issue. I looked
11 at NUREG-1717 for magnesium-thorium alloy to
12 see what was there. And actually I believe
13 you brought up the question of thorium welding
14 rods when we were first discussing --

15 **MR. GRIFFON:** Mel did.

16 **DR. MAKHIJANI:** Okay, NIOSH brought it up
17 anyway, and because I wasn't aware of it, and
18 I did note that there was this German study
19 which I cited that has been discussed in
20 NUREG-1717. So I think that this has been a
21 studied issue. So I don't know what the
22 universe of data is.

23 **MR. GRIFFON:** I think we should probably
24 keep it on our radar screen in terms of
25 thorium use, but my gut feeling there, and we

1 should look at this further, is that if you
2 have all these job cards, a lot of job card
3 data. And I'm not saying the DR would
4 necessarily go down this path, but we have to
5 answer the question of could you estimate a
6 plausible upper bound.

7 And if you know welder and if you know
8 something about source term as Jim said, I
9 think you can probably estimate an upper, but
10 that's maybe for you to consider. But I think
11 we should keep it on the radar, but I don't --

12 **DR. ULSH:** I think maybe the question, Mark,
13 is where is the appropriate context to
14 consider this issue. I mean, since we've
15 already said that in, this is not a Rocky
16 Flats specific. It's all over. So it might
17 be one of those things that we handle wherever
18 we're handling overarching issues. I don't
19 know.

20 **DR. NETON:** There's overarching issues. The
21 overarching dose reconstruction issue list is
22 what we're maintaining now.

23 **MR. GRIFFON:** I think it rolls into a
24 complex-wide question, but just in terms of
25 being able to answer the issue at hand, do we

1 have any SEC concerns here, I think we want to
2 be able to answer that for Rocky now. So it
3 might evolve into --

4 **DR. ULSH:** So do I hear an action item then?
5 Would it be to consider intakes from --

6 **MR. GRIFFON:** Yeah, I think we should --

7 **DR. NETON:** I think we have to maybe sketch
8 out a position of maybe not in extreme detail,
9 but a position that would convince people that
10 this is a tractable problem. Put it to bed
11 but not necessarily come down to the actual
12 dose assignments but, and then table the
13 ultimate model for the overarching issues
14 list. And that's to make sure we don't lose
15 track of it because that's going to apply to
16 many other sites.

17 **MR. GRIFFON:** I think you've probably got
18 the pieces, too. You've got this NUREG, and
19 you've got enough information about the source
20 term that you can --

21 **DR. NETON:** Feel comfortable with that so
22 they're like three, four percent thorium, a
23 similar amount. And let's just vaporize it in
24 the presence of the Board.

25 **MR. GRIFFON:** We'll add that on to the

1 thorium source term question and NIOSH will
2 give us some kind of response on it.

3 **DR. MAKHIJANI:** That takes care of it.

4 **MR. GRIFFON:** Yeah, now on the other, as far
5 as the other, we sort of got sidetracked with
6 rolling and that was probably my fault, but so
7 I think we're pretty comfortable, when Tony
8 was leaving, I think we were saying you've got
9 some urine data and at worst case you could
10 assume they're all less than MDA.

11 You've got something to plausibly
12 upper bound it. I knew there was limited
13 thorium urinalysis data. I didn't understand
14 that it covered most all those people involved
15 in that limited operation. If SC&A's
16 comfortable with that, I think we, it seems
17 like there's a reasonable way to bound it,
18 right?

19 **MR. FITZGERALD:** I think again through the
20 call we've had and this discussion, I think
21 we're pretty comfortable. And I think
22 assuming there's an upper bound analysis going
23 on with the other three, I --

24 **MR. GRIFFON:** Yeah, then we're on to the
25 other three, and you're going to, NIOSH, still

1 is going to provide some sort of empirical
2 analysis on those other three.

3 **DR. ULSH:** Yeah, I think the ball's in our
4 court. We took a shot at it and SC&A --

5 **MR. GRIFFON:** On the technical call, right.

6 **DR. ULSH:** Right, SC&A didn't necessarily
7 agree with our approach. So we have agreed to
8 take another look at --

9 **DR. NETON:** I think it's a matter of
10 parameter selection. What parameters were
11 selected.

12 **MR. GRIFFON:** You're really looking at sort
13 of a bounding analysis now, right? Is that
14 what I understand? I wasn't on the call, but
15 --

16 **DR. NETON:** We haven't given up on the fact
17 that NUREG-1400 isn't applicable, although we
18 agree that there are parameter selection
19 issues there that would maybe not make it
20 quite as conservative as we maybe heretofore
21 thought. We need to look at it a little
22 closer.

23 **MR. GRIFFON:** So you've got those actions?

24 **DR. ULSH:** Yes.

25 **MR. GRIFFON:** And the only additional thing

1 is the welding rods, and that question.

2 All right, moving passed thorium at
3 3:26, plenty of time. This is where we speed
4 up. I have next --

5 Do you want to put these two items
6 together, Joe?

7 **MR. FITZGERALD:** Yes, I think so.

8 **LOG BOOK ANALYSIS AND DATA INTEGRITY AND SAFETY CONCERNS**

9 **MR. GRIFFON:** Log book and data integrity.

10 **MR. FITZGERALD:** Right.

11 **MR. GRIFFON:** So log book analysis and
12 before I had safety reports, but Joe says that
13 there wasn't really outstanding actions on
14 that. I don't know if we really need an
15 update.

16 **MR. FITZGERALD:** The safety concerns piece,
17 and certainly, Kathy's on the phone as well.
18 We certainly finished first and distributed it
19 to the work group back in November.
20 Certainly, I think maybe the easiest thing is
21 for Kathy to just sort of capsule all three,
22 the data integrity examples, log book review,
23 and maybe just provide a short overview of not
24 the specific details but the sort of bottom
25 line conclusions in the SEC context and just

1 sort of walk the work group through. Would
2 that help?

3 **MR. GRIFFON:** That would be helpful, yes, so
4 we're going to log book analysis, data
5 integrity and safety concerns.

6 **MR. FITZGERALD:** Yeah, they overlap, and I
7 think it would probably be helpful not to
8 separate them out even though that's how we
9 issued them. This way it could be digestible.

10 **MR. GRIFFON:** Kathy, if you can give us a
11 fairly quick summary of each of those items,
12 then maybe we can get into some more detail on
13 the log book question.

14 **MS. DeMERS (by Telephone):** I will try. If
15 you remember in the petitions, a lot of people
16 brought up a concern that that something was
17 wrong with the badge --

18 **MR. GRIFFON:** Hold on, Kathy, you might have
19 to speak a little louder. Are you on a
20 speaker phone?

21 **MS. DeMERS (by Telephone):** No, no.

22 **MR. GRIFFON:** Ray's having a little trouble
23 hearing you so go again.

24 **MS. DeMERS (by Telephone):** If you remember
25 from the petition, several people brought up

1 concerns about receiving years when they were
2 working in high dose rate areas, and we were
3 trying to get to the bottom of this in our
4 review with the safety concerns and the log
5 book review. The (inaudible) of (inaudible)
6 NIOSH most of those from the list of probably
7 4,000 safety concerns. And NIOSH looked at
8 them and evaluated them for their relevance to
9 the SEC petition. And SC&A was asked to
10 evaluate their evaluation.

11 And in general, there was good
12 agreement, but there were some areas where
13 there was not agreement. For example, there
14 were some disagreements regarding how they
15 handled external dosimetry investigations.
16 There was some disagreement in relation to
17 some of the assertions regarding individuals
18 involved with the concern that said basically
19 I got a zero. I don't believe this happened
20 in X,Y area; the dose rate was X, Y, Z.

21 This kind of spills into the data
22 integrity example. The basic answer was that
23 the areas were closest at the maximum dose
24 rate but that that was not necessarily the
25 dose rate that the individuals were receiving

1 from where they were standing. Now we looked
2 at a couple of these situations and that
3 explanation doesn't really pass with us.
4 There's got to be more to this because it's
5 been brought up in the safety concerns. It's
6 been brought up multiple times in the comments
7 in the data integrity section. We haven't
8 really found I would say conclusive evidence
9 of a systemic problem, but it sure does come
10 up frequently in different formats.

11 And with respect to assigning zero
12 when people were in high dose rate areas, is
13 it that there should be some further
14 investigation into that? And one of the
15 contentions was that the people who were
16 communicating those dose rates in the petition
17 were not knowledgeable of the dose rate levels
18 and how they're measured. So in fact, most of
19 these people were radiological control
20 technicians so they did have the knowledge to
21 interpret the readings. In fact, they were
22 responsible for recording them.

23 And with respect to dosimetry
24 investigations basically what we have is the
25 word of the RADCON staff that they occurred.

1 We have a few, actually, I think only one log
2 book entry that said he went out in the field
3 and tried to figure out the dose for
4 (unintelligible) because the badge was
5 damaged. So either these investigations
6 didn't happen in the field or they weren't as
7 significant to be recorded in the log books or
8 someone else did them if we assume that the
9 RADCON personnel are correct. Basically, we
10 have no paper evidence that these occurred
11 prior to the mid-'80s. So that's kind of
12 where we stand on that.

13 One of the things that I noted in the
14 data integrity analysis was that you really
15 had to go in and understand the entire
16 comments, and I ended up re-describing quite a
17 number of comments as a result. And I felt
18 that NIOSH wasn't really answering the
19 question or the comment that was brought up by
20 the person providing the affidavit or the
21 comments. Those were really the two major
22 issues where there was some disagreement
23 amongst the safety concerns and data integrity
24 examples.

25 Another thing that I noticed with

1 respect to the data integrity example is that
2 they missed about seven or eight comments
3 which were quite important as they went
4 through and captured comments from the
5 Advisory Board meeting in Denver. And I went
6 ahead and added those, and NIOSH, of course,
7 had not had a chance to respond to them so
8 we're not quite sure where we stand on those
9 seven or eight comments.

10 **MR. GRIFFON:** I think we did say that for
11 the safety concerns report, I think we pointed
12 out at one of the previous meetings that there
13 was some individual items that there was
14 disagreement, but at least as a work group we
15 told NIOSH don't, we don't want you to, we
16 don't expect you to further investigate these
17 individual cases. So that may be, that may
18 have been our decision.

19 For the data integrity, I get these
20 things confused sometimes, these three or four
21 kind of do overlap a little bit in my mind. I
22 can't remember if there were specific items
23 that we have asked for follow up on or --

24 **MR. FITZGERALD:** Well, this was the specific
25 73 page, very detailed compilation that NIOSH

1 put together.

2 **MS. DeMERS (by Telephone):** This came out or
3 this came out in mid-January, very recently.

4 **MR. FITZGERALD:** August, yeah, right,
5 August.

6 **MS. DeMERS (by Telephone):** A lot of this
7 concern is raised with respect to the safety
8 concerns are also raised in the data integrity
9 example response. And it's almost more
10 beneficial to address them in terms of the
11 data integrity examples.

12 **MR. FITZGERALD:** Yeah, Kathy, this is Joe.
13 I think it's fair to say though for both of
14 those documents that we do have, in fact,
15 interpretive differences on the specific cases
16 within the safety concerns as well as in the
17 data integrity examples. And I think you
18 added that there were maybe seven or eight
19 examples that may have come out at the Denver
20 meeting that were not necessarily in the data
21 integrity compilation that we've added for
22 comment that we have since provided on January
23 3rd to NIOSH for review. But I think the
24 overall conclusion again with those
25 differences that we weren't able to

1 conclusively demonstrate a pattern or systemic
2 problem, any evidence of fraud necessarily in
3 the broader sense. Is that fair?

4 **MS. DeMERS (by Telephone):** We were not able
5 to conclusively identify fraudulent data
6 entries with respect to those two reviews.
7 However, you need to be aware that there are a
8 lot of examples, and I guess you will have to
9 think about what the threshold is for
10 determining if that, if you're going to accept
11 NIOSH's explanation in regard to that.

12 **MR. GRIFFON:** Hold on, Kathy, Brant wants to
13 reply.

14 **DR. ULSH:** But at the end of the day, as Joe
15 said, I think you discovered no evidence of
16 fraudulent data entry. I mean, it's SC&A's
17 position that you have discovered no evidence
18 that would support that. Is that correct?

19 **MS. DeMERS (by Telephone):** I'm not
20 disagreeing with that. I would emphasize we
21 don't have any conclusive evidence.

22 **MR. FITZGERALD:** We can't find it.

23 **DR. ULSH:** Well, okay, I guess the other
24 part of that question then is how hard have we
25 looked. And I would put on the table that we

1 put out a 73-page document and considered
2 every concern expressed at the Board meeting
3 with the exception possibly of seven that we
4 might have missed. We've looked at 5,000
5 safety concerns. We looked at -- what? -- 60
6 log books? And if you don't find something
7 after all of that, can't you draw some kind of
8 a conclusion from that?

9 **MR. ELLIOTT:** I think we've surpassed the
10 threshold here. In a world of limited
11 resources I understand and appreciate the need
12 to respond to these individual allegations and
13 assertions that were made in these affidavits.
14 But I think we've more than enough addressed
15 this issue.

16 **MR. GRIFFON:** That's why I didn't ask for
17 any follow up from NIOSH on these items
18 because I think at this point it's one of
19 those questions, like with Y-12. I mean,
20 we've got a bunch of prongs, and we're going
21 to look at the weight of this evidence --

22 **MR. FITZGERALD:** And I think you have --

23 **MR. GRIFFON:** Everything here points to at
24 the worst I think inconclusive is sort of
25 where SC&A is weighing in. At the best it is

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

--

MR. FITZGERALD: And you have the reports, and in a sense we were very careful I thought about how to lay this out. And I think our conclusions are not inconsistent with what you've said that we've looked hard, that we've looked far, and we did find a number of specific cases where we were concerned. But in the final analysis there wasn't any evidence of fraud or a systemic pattern that we would be concerned about and that's based on what we did look at.

MR. GRIFFON: How about for the log book analysis, the last piece?

MR. FITZGERALD: Well, that was the most recent, and I realize that was because of the Privacy Act review that got over kind of late. That got over the 19th, but again, Kathy, do you want to summarize pretty much, that has a long history. Maybe you can briefly summarize where that came from way back when.

MS. DeMERS (by Telephone): Back in March I started work with the Rocky Flats records folks to pull back some records, primarily dosimetry and procedures, processing logs,

1 that type of material. And then I went and
2 visited Rocky Flats and talked to the
3 petitioners on the 27th or 29th of March. And
4 in the course of talking to the petitioners
5 they indicated that the log books may disagree
6 with the dosimetry records.

7 And so I went back to the records
8 folks, and I said can you search for RTC log
9 books, contamination control log books, et
10 cetera, and provide me with the results. And
11 of course, they didn't have time to pull that
12 from the Records Center in one day. So they
13 weren't available for review when I was there.

14 The plan was to take some of these
15 affidavits and see if we could locate the
16 person in the log books and follow through the
17 dosimetry processing logs and make sure that
18 they didn't have a damaged dosimeter or some
19 sort of situation where a zero would be,
20 situations that would require a dosimetry
21 investigation. Then we were to go to the
22 actual dosimetry records and do a comparison
23 back to the original number in the log book.

24 Well, what happened when we went
25 through several log books was that we couldn't

1 find these particular people. So we decided
2 to evaluate people with dose information that
3 were in the log books. But let me back up
4 here a little bit.

5 The original intention with the second
6 request to Rocky Flats for the log books was
7 to have them scanned and then I was going to
8 go through and walk through this process. In
9 April the working group decided to turn this
10 over to NIOSH. And we went through several
11 iterations of trying to explain, you know,
12 what my original plan was and how they might
13 implement it. But in the meantime there were
14 these log books sitting there.

15 And when it was turned over to NIOSH,
16 they were to go through those log books, and
17 there were boxes of them. And at least say
18 this will be useful; this will not. And if
19 there were log books that were useful, they
20 were to scan them and provide a copy also to
21 SC&A and the working group.

22 Kind of on a separate path, ITT was to
23 make a very, very specific request of Rocky
24 Flats in the process of my own review being
25 centered around identifying the main

1 supervisors over the buildings that may have
2 had log books. They centered around the 1969
3 fire. So those '69 field log books were not
4 intended to cover a large range; whereas, the
5 initial log books that I had asked the records
6 people to pull, were. As a matter of fact
7 they ranged from 1957 through 1996.

8 In July NIOSH came back with a review
9 of the famous Kittinger log which spans from
10 '58 or '56 through '68. And they extracted
11 quite a number of individuals from the log
12 book and compared the doses in the log book
13 back to the health physics file. A lot of
14 these were external dosimetry results.
15 Unfortunately, they were for a cycle for some
16 of them rather than a quarter when the health
17 physics file really had a quarter.

18 So we determined whether they were an
19 exact match or consistent, and we had no
20 problems with the exact matches or the
21 consistent matches. Then they came out with -
22 - and Brant, you're going to correct me if I'm
23 wrong -- with about 94 percent agreement.

24 **DR. ULSH:** Yeah, that's about right, Kathy.

25 **MS. DeMERS (by Telephone):** There were

1 others that they didn't have files for, and
2 they had to go back to Rocky Flats and request
3 them. And at that point, that review, there
4 was a discussion about the fact that, well,
5 that probably knocked people out of that log
6 book. But that log book doesn't represent the
7 entire span of time, and it also doesn't
8 represent the uranium area or the non-
9 plutonium area.

10 **DR. ULSH:** Wait a minute, Kathy. Are we
11 talking about the Kittinger log book or are we
12 talking about --

13 **MS. DeMERS (by Telephone):** Yes, the
14 Kittinger log book.

15 **DR. ULSH:** Oh, okay, the Kittinger log book,
16 yeah, I reviewed half of the data --

17 **MR. GRIFFON:** That first one.

18 **DR. ULSH:** Yeah, that first one. I don't
19 remember the number, but I found a pretty high
20 --

21 **MR. GRIFFON:** Agreement.

22 **DR. ULSH:** -- level of agreement, yeah. The
23 94 percent number though is for our overall
24 log book analysis. We found overall we found
25 94 percent agreement.

1 **MS. DeMERS (by Telephone):** That's pretty
2 good agreement with the Kittinger logs to go
3 back and look at consistent results and exact
4 results.

5 However, 19 of these people from the
6 Kittinger log were picked up in the second
7 review which was to cover from 1969 through
8 the '90s.

9 **MR. GRIFFON:** Right, this is the final
10 report that you issued to us.

11 **MS. DeMERS (by Telephone):** Right.

12 **MR. GRIFFON:** The log book review, yeah.

13 **MS. DeMERS (by Telephone):** I kind of
14 segregated them into two separate reviews.
15 But there were a couple that got dropped in
16 the transition, but that was primarily because
17 we decided enough was enough with that log
18 book.

19 There was a second review that was
20 done, and like I said it was supposed to cover
21 1969 through the 1990s. In July, NIOSH was
22 asked to come up with a sampling plan for how
23 they were going to sample further log books,
24 and these log books were to cover various
25 processes onsite including plutonium and non-

1 plutonium areas.

2 And what they came back with was not a
3 sampling plan but a review of a subset of
4 those 50, and that's an approximate number,
5 log books that I had retrieved and subsequent
6 from the original log book request. And as I
7 said these were more specific to particular
8 time periods, and they were targeted at the
9 RADCON field supervisors.

10 **MR. GRIFFON:** Yes, so now we're on the final
11 report from NIOSH. And what time period did
12 that cover, Kathy?

13 **MS. DeMERS (by Telephone):** That covers from
14 1957 through 1971, and that included 20
15 urinalysis log books and 16 field log books.
16 As a matter of chance there were log books
17 from the earlier years from the uranium area,
18 and there were log books for select years for
19 the plutonium area. And that was primarily
20 because the supervisors that I had requested
21 were from all over the plant.

22 **MR. GRIFFON:** Is that, I'm thinking 20
23 urinalysis logs, is that accurate?

24 **DR. ULSH:** I don't know how many urinalysis
25 logs there were.

1 **MR. GRIFFON:** Anyway, we can do that later.

2 Go ahead, Kathy, sorry.

3 **MS. DeMERS (by Telephone):** Well, again,
4 various items were extracted from the field
5 log books, urinalysis results, whether a
6 person was involved in an incident and was
7 sent to the in vivo counter. I think there
8 was in one count and some external dosimetry
9 results. With respect to the log books, they
10 actually select a claimant from within the log
11 books and made a comparison of that urinalysis
12 log book to the health physics file, and in
13 general, we had compared the results to the
14 health physics file, which I call the hard
15 copy record here, 94 percent of the bioassay
16 results agreed or were consistent.

17 In the case of in vivo counts, and a
18 lot of times they will just reference that
19 they sent somebody to the in vivo counter so
20 we were virtually just looking for evidence
21 that they had an in vivo count. Eighty-six
22 percent of the entries polled agreed with what
23 was being stated in the log books. There were
24 four individuals where we didn't have files
25 available, health physics files available for.

1 And the agreement with the dosimetry results
2 listed in the log books versus the health
3 physics records were fairly good.

4 One log book that they selected
5 individuals from was called, I'm going to
6 refer to it as the 1966 through 1969 Special
7 Analysis Log Book. And this had bioassay
8 results for radionuclides other than uranium
9 and plutonium. And they polled 24 people I
10 believe out of that log book, and again,
11 compared the log book results back to the
12 health physics file. We did not have the
13 means available to do this comparison so we
14 were not able to verify their results. But in
15 their write-up it indicated that they did not
16 get agreement in eight cases out of the 24.

17 **MR. GRIFFON:** That's for the special
18 radionuclide log?

19 **MS. DeMERS (by Telephone):** Yes.

20 We also did a comparison of the log
21 book results to the HIS-20 external database
22 and the urinalysis database, and this is where
23 we started to discover some issues.

24 We had 68 percent agreement between
25 the bioassay results and the log versus the

1 health physics. Let me back up. First is the
2 data available in HIS-20, and the remainder of
3 those people were not showing up in HIS-20.
4 So I went and I scanned the people who were
5 not showing up in the HIS-20 to determine
6 whether they had zero doses or positive doses.
7 And there was a mixture so we're not just
8 talking about people who didn't have positive
9 urinalysis data in this case.

10 **MR. GRIFFON:** This could be important back
11 to our discussion on coworker models
12 obviously, that last point.

13 **DR. ULSH:** (Unintelligible).

14 **MR. GRIFFON:** Yeah, and then there could be
15 explanations if they retired before '77 or
16 whenever. We know, we know the explanations.

17 Go ahead, Kathy. Was that it for --

18 **MS. DeMERS (by Telephone):** There are two
19 other things.

20 The problem was not as bad with the
21 HIS-20 data, between the HIS-20 database and
22 the external data, but it was still there.

23 And the final concern that we had was
24 going back to the original log book request
25 that I made of Rocky Flats of the RCT logs,

1 the contamination logs, et cetera, which got
2 turned over to NIOSH, and there's no
3 indication by NIOSH that whether those log
4 books were useful or not for the SEC petition
5 review. And they have indicated that they
6 reviewed 450 boxes of documents; however,
7 we're looking at 59 log books here and there's
8 a delta there that SC&A doesn't know anything
9 about.

10 We don't know if those log books are
11 useful or whether (unintelligible) is not
12 having any individual data in it. We don't
13 know the contents of these 450 boxes, and
14 there's a concern that they concentrated on
15 these 60 log books that are on the O drive
16 which were not representative of the '69
17 through '99 timeframe.

18 **MR. GRIFFON:** 'Ninety-two.

19 **MS. DeMERS (by Telephone):** I think Arjun
20 said through --

21 **DR. MAKHIJANI:** Two.

22 **MR. GRIFFON:** 'Ninety-two.

23 **DR. MAKHIJANI:** Early '92.

24 **MS. DeMERS (by Telephone):** So we were left
25 wondering, okay, what about these other time

1 periods. Did you find any log books in here?
2 What about the representativeness of what you
3 did choose to review? And this kind of goes
4 back to the sampling plan and the fact that
5 the sampling plan was not produced but instead
6 this review was produced.

7 **MR. GRIFFON:** Kathy, I guess I just want to,
8 I mean, from my read on this two things jumped
9 out to me to follow up on anyway. One was
10 this question of, you know, we did, there was
11 an action item to do a sampling plan. I
12 understand. You did a final report, but the
13 real question, at the end of the day we just
14 want to make sure we cover all time periods of
15 concern and all potential, all operations of
16 concern. So if we, I think it does look like
17 - is it from '71, you know, '72 through '92
18 seem to be not represented very much in this
19 review.

20 **DR. ULSH:** And the reason that they're not
21 represented, Mark, is that log books that
22 contained the kind of data that we were
23 looking for did not exist after '71 or '72 and
24 they went to an electronic --

25 **MR. GRIFFON:** Yeah, we know there weren't

1 any urine logs, and I don't know if there are
2 any other logs that --

3 **DR. ULSH:** The same with external, now if
4 there are other logs --

5 **MR. GRIFFON:** No, not just, yeah, okay, I
6 mean, the other field logs that would have had
7 some --

8 **DR. ULSH:** There are other logs, the RCT and
9 contamination log books that exist into the
10 later time periods, but as we discussed at
11 previous working group meetings, those logs
12 are not the kind of logs that contain the
13 useful information that we needed for cross
14 walking. We talked about that, that there
15 wasn't a lot of information in those logs.

16 **MR. GRIFFON:** We talked about the foremen
17 logs not being very useful. I don't remember
18 talking about the RADCON or DECON logs. Maybe
19 we did.

20 **DR. ULSH:** I think we did, didn't we?

21 **MR. GRIFFON:** But I thought the foremen logs
22 were the ones that we were --

23 **MR. FITZGERALD:** I think it was clear that
24 the foremen logs were not useful in any sense,
25 but I think it was --

1 **MR. GRIFFON:** I mean, I haven't looked at
2 these things so if you reviewed and --

3 **DR. ULSH:** Well, I'm trying to think back
4 from months ago, but I think I presented an
5 example of not just a foremen log but I
6 thought a contamination control log book. I
7 don't know about RCT. I can't remember. It's
8 too far back, but there just wasn't, that they
9 were very, very data poor. I didn't, I don't
10 think I saw any data in there.

11 **MR. MEYER:** Oh, we looked at RCTs.

12 **DR. ULSH:** We looked at RCT logs?

13 **MR. MEYER:** Yes.

14 **DR. ULSH:** Okay.

15 **MR. MEYER:** Microfilm.

16 **DR. ULSH:** Yeah.

17 **MR. GRIFFON:** With microfilm, too, you said?

18 **DR. ULSH:** There are some things here that I
19 do need to respond to.

20 **MR. GRIFFON:** So just let me, so that's one
21 question, and I think you've responded to it.
22 The only other thing that jumped out at me
23 from this review is the tie back into the HIS-
24 20 database. And I think there are some
25 possible explanations for some of these

1 things, but I wanted to ask did we, I thought
2 at some point early on in this process you all
3 did an analysis of hard copy records versus
4 HIS-20 and came out with very strong
5 agreement. Was that with log books or what
6 were you comparing that, that point? I think
7 it was RAD files with HIS-20.

8 **DR. ULSH:** Wasn't it TLD worksheets?

9 **MR. MEYER:** TLD worksheets and then I think
10 --

11 **MR. GRIFFON:** So it was external or was it
12 both?

13 **MR. MEYER:** Yeah, external.

14 **DR. ULSH:** External. I presented those
15 results at the April Board meeting when we
16 gave our ER presentation. I don't remember
17 the exact numbers. But, yeah, I'm sure it was
18 TLD worksheets versus HIS-20. And then I
19 can't remember about internal.

20 **MR. MEYER:** We did some internal, too.

21 **MR. GRIFFON:** And TLD worksheets would have
22 been beyond the, I forget what time period you
23 covered. We'll have to resurrect that
24 document, but it could have been started in
25 the early '70s, right?

1 **DR. ULSH:** Yes.

2 **MR. GRIFFON:** So it would have been through
3 the '70s, yeah.

4 **DR. ULSH:** I don't know. I can't remember
5 the time period that the ones we looked at
6 covered. I don't remember.

7 **MR. GRIFFON:** I mean I think we might want
8 to reflect on that piece because that may help
9 us, you know, like I've said again and again,
10 we've got several prongs, no one item is going
11 to cover this perfectly.

12 Did you write that, Craig or was that

13 --

14 **MR. LITTLE:** Pardon?

15 **MR. ELLIOTT:** Was that yours or, you wrote
16 that, right?

17 **MR. LITTLE:** Yeah.

18 **MR. GRIFFON:** I can't remember when it was
19 provided. I think it goes back to --

20 **MR. ELLIOTT:** Or when you issued it? It was
21 before the April meeting.

22 **MR. GRIFFON:** Yeah, I think it was in March
23 at the Boston meeting that that first came
24 out. Anyway, we might want to reflect back on
25 that in comparison to this.

1 Go ahead, Brant. That was my two.

2 **UNIDENTIFIED (by Telephone):**

3 (Unintelligible) some of that information is
4 captured in OTIB-58.

5 **MR. GRIFFON:** OTIB-58 has that reference?

6 **UNIDENTIFIED (by Telephone):** Yes.

7 **MR. GRIFFON:** Okay, we'll look in OTIB-58
8 for that reference.

9 **UNIDENTIFIED (by Telephone):** It's Section
10 Six.

11 **MR. GRIFFON:** Section Six, thank you.

12 **MS. DeMERS (by Telephone):** Let me clarify
13 something. In the log book analysis we did
14 not go from HIS-20 to the health physics file.
15 We went from the log book to HIS-20.

16 **MR. GRIFFON:** I understand, Kathy. I'm just
17 saying that there was another type of
18 analysis. I was getting a little history
19 lesson. I couldn't remember if they looked at
20 log books or if they looked at TLD worksheets
21 as it was.

22 **DR. ULSH:** Okay, well, I'll make this brief.
23 It might have been Kathy's original plan to
24 look at the log books as they surrounded the
25 affidavits, but we were never tasked by the

1 working group with focusing on, in any way, on
2 the particular individual instances listed in
3 the affidavits. In fact, we were tasked to do
4 a random sample which is exactly what we did.
5 This analysis was never meant to be
6 exhaustive. It was never meant to look at
7 every log book that existed. What we were to
8 do was to come up with a random sample.

9 Now in terms of why we didn't look at
10 the log books past 1971 as I've already
11 stated, the types of log books that were most
12 useful, the urinalysis log books primarily,
13 and also the ones that contained a lot of
14 external dosimetry data did not extend past
15 1971, '72, right around the time when they
16 started going to electronic recording. So
17 those log books simply don't exist.

18 Now there are, as I said, RCT
19 contamination control various kinds of log
20 books, but those are of the type that we
21 determined and discussed with the working
22 group that they were not, they didn't contain
23 the kind of data that we needed to cross-walk
24 to draw a conclusion.

25 Now Kathy mentioned the 60 log books

1 that are on the O drive, and she mentioned
2 that we reviewed a subset of them. I don't
3 believe that is accurate. I believe that we
4 reviewed every log book that has been posted.
5 In terms of those 60 log books, I mean it is
6 presumed that those 60 log books were
7 requested by SC&A because they related to a
8 specific concern in the affidavit. So to that
9 extent I think that our analysis is even more
10 targeted. I mean if what Kathy's saying is
11 true that those log books supported the
12 particular concerns that she had --

13 **MR. GRIFFON:** Let's step back and remember a
14 meeting where we talked about the overall goal
15 of this. There is specific references in the
16 transcripts where we said a lot is derived
17 from some of the affidavits and comments, but
18 we're really, our goal here is the SEC, the
19 entire population covered by the SEC. So we
20 want to do a plan that would cover all the
21 decades, '50s, '60s, '70s, '80s, up to '92. I
22 think we cut it off because the D&D was kind
23 of a separate thing, and different types of
24 operations, relevant operations.

25 **DR. ULSH:** Right, uranium and plutonium.

1 **MR. GRIFFON:** Yeah, I don't particularly
2 remember. I'm not doubting that you said
3 this, but I don't particularly remember. I
4 remember the foremen's logs being dismissed
5 because we had several examples of those. But
6 the other stuff I guess I don't remember that
7 as well. I don't doubt that you mentioned it
8 in a meeting. We've had quite a few meetings.

9 **MR. MEYER:** Well, an example I guess of the
10 RCT log book is the first notice of the '69
11 fire was in an RCT log book, and we did talk
12 about that. So that was one of them that --

13 **MR. GRIFFON:** Yeah.

14 **MS. DeMERS (by Telephone):** I want to
15 clarify something here. The original plan was
16 to target people who issued affidavits, but we
17 found that we could not find those specific
18 people in the log books. So we expanded it to
19 people with data in the log books.

20 **MR. GRIFFON:** Okay. But anyway, I'm just
21 saying we also expanded it to cover the SEC
22 petition as a whole. So I mean I guess the
23 question would be, you know, it sounds like
24 you reviewed, you know, you're telling the
25 work group that you've reviewed other of these

1 other RCT or DECON log books, and you've made
2 determinations that there's just nothing there
3 worth, nothing to cross-check basically.

4 **DR. ULSH:** We looked at the log books in
5 their hard copy form to determine whether it
6 was worthwhile to scan them because as we said
7 --

8 **MR. GRIFFON:** Well, that was my next
9 question, were they available in scan so we --

10 **DR. ULSH:** There were 450 boxes of log
11 books, and this is the most resource-intensive
12 part of the whole operation is scanning these
13 things. So we looked at them before they were
14 scanned, before they would have gone to
15 scanning to see if it was worthwhile to do
16 that. And we determined that it really
17 wasn't. So everything that was scanned was
18 posted on the O drive. There are no more log
19 books scanned that we are sitting on or hiding
20 or anything like that. You have everything
21 that we had scanned.

22 **MS. DeMERS (by Telephone):** We understand
23 that.

24 **MR. ELLIOTT:** And we don't see the utility
25 in going forward and looking, scanning the

1 other log books because they don't bring
2 anything to bear.

3 **DR. ULSH:** Exactly.

4 Now in terms of HIS-20 versus the
5 health physics files, we focused on the health
6 physics files because remember that the
7 original concern was is the data that's being
8 used for dose, individual dose reconstructions
9 reliable or are there some problems here that
10 would indicate fraud or whatever the concerns
11 were. So we thought it was most relevant to
12 go to the RAD files themselves even though
13 that was, you know, a bit more work.

14 But there was another motivation for
15 doing that, and that is the known limitations
16 at this point. We talked about the in vivo
17 issues with HIS-20, and we've also talked
18 about what Mark mentioned that individuals who
19 terminated employment prior to 1976 or seven,
20 something like that, their data was not
21 initially loaded into HIS-20. Some of it was
22 later restored if they were part of the
23 medical recall program but certainly not all.

24 And therefore, we figured that it
25 would be most informative for those reasons to

1 look at the data in the hard copy RAD file.
2 That's what's used in individual dose
3 reconstructions. That's why we didn't --

4 **MR. GRIFFON:** That's fine. This is why we
5 go down this path all the time, but that's
6 what's used in many of the individual dose
7 reconstructions. I mean you have coworker
8 models for a reason. You're going to use them
9 eventually.

10 **DR. ULSH:** Yes, yes, we did.

11 **MR. GRIFFON:** And there was a third reason.
12 It's because the work group tasked you to look
13 at the individual RAD files. We didn't ask
14 you to look at the database stuff. We wanted
15 you to look at the RAD files. That's correct.
16 I don't disagree with that.

17 **DR. ULSH:** And you know I've got to go back
18 to, I mean if you've never taken part in any
19 of the lead up to this meeting, you would
20 think from listening to the summary here that
21 there were a lot of big important issues that
22 SC&A did conclude at the end they didn't find
23 anything, that indicated systematic problems.
24 And I go back to something that John Mauro
25 said when I presented the first results from

1 the Kittinger log book. I reviewed half the
2 data points in it and John said something
3 like, you know, if it walks like a duck, and
4 it quacks like a duck, you know, there's
5 really no reason to go look at the other half
6 of this log book.

7 And I would extend that argument here.
8 I mean, there are some concerns, I guess,
9 being expressed that we didn't look at a
10 representative sample. My question is, I
11 mean, if these log books included at least,
12 the log books that Kathy identified that
13 correspond to places where the petitioner was
14 saying that there were issues, and we've
15 looked at these, and we haven't found, we
16 found 94 percent agreement, what are the odds
17 that the other log books that exist contain
18 some problem that we haven't come across.
19 That's analogous to the argument that John
20 Mauro made after the Kittinger log.

21 **MR. GIBSON (by Telephone):** Brant, this is
22 Mike. Can I just cut in for a minute? You
23 know, I take a little bit of exception to the
24 way you just characterized what you just said,
25 if it walks like a duck, quacks like a duck,

1 it must be a duck.

2 **DR. ULSH:** I didn't say that. John Mauro
3 said it.

4 **DR. MAURO (by Telephone):** No, I didn't
5 quite say that. I said this house is clean.

6 **DR. ULSH:** Oh, yeah, something about rotten
7 in Denmark or --

8 **MR. GIBSON (by Telephone):** I just want to
9 say that, you know, having lived in the DOE
10 world if it walks like DOE, and it talks like
11 DOE, you can't be assured of nothing.

12 **DR. ULSH:** Mike, my point was if we've
13 looked in a large sample of log books, and we
14 haven't discovered an issue, what is the
15 likelihood that we're going to find an
16 undiscovered problem if we look at more
17 similar log books. That was my point. That's
18 all I'm saying. I'm not saying anything about
19 DOE's credibility or anything like that.

20 **MS. DeMERS (by Telephone):** This is Kathy.
21 Can I make two requests?

22 **MR. GRIFFON:** Sure.

23 **MS. DeMERS (by Telephone):** One would be
24 that we get the names associated with those
25 pulled from the Special Analysis log books so

1 that we can include that in our review. And
2 the other issue is can NIOSH document what
3 happened in their review of these log books
4 that were not scanned.

5 **MR. GRIFFON:** I think you're documenting to
6 an extent on the record here. I think Brant's
7 documenting it to an extent. I mean, I don't
8 know if you can describe that better how you
9 got those 450 boxes I think is the question.
10 You looked at how many and you determined that
11 they weren't very useful for in terms of, I
12 mean, I think that --

13 **DR. ULSH:** I can't say off the top of my
14 head. If that's something you want, we can do
15 that.

16 **MR. GRIFFON:** Yeah, just a description of I
17 think is what --

18 **MR. FITZGERALD:** Well, the presumption, too,
19 then is the balance of those log books were in
20 fact perhaps bridged these time periods so we
21 talked about they were the basis for the
22 sampling plan so that's the other kind of
23 implication although I'm not sure that's,
24 whether you confirmed that or not. Because we
25 don't know what's in those boxes. I think

1 that's what she's saying.

2 **DR. ULSH:** Let me clarify. I misspoke
3 earlier when I said that we reviewed 450
4 boxes. We pulled 450 boxes, and we looked
5 through those for log books, and it wasn't 450
6 boxes full of log books. I don't want to
7 imply.

8 **MR. GRIFFON:** So you looked through log
9 books, and you sampled from, but you can give
10 us a little description of that field
11 activity. And the first item I think you can
12 provide us with those names for the Special
13 Analysis log book. Were they in the report?
14 I don't know if --

15 **DR. ULSH:** That's a very, I'm familiar with
16 that log book. I've looked at it a lot.
17 There are, I think, maybe 40 individuals in
18 that log book. In terms of identifying the
19 exact individuals that were in there, we'll
20 find out.

21 **MS. DeMERS (by Telephone):** What I'm
22 referring to is the individuals you did the
23 comparison for.

24 **DR. ULSH:** Okay, yeah, I'll try to track
25 that down. But I will point out though that

1 that log book contains results, urinalysis
2 results for what we've categorized as other
3 radionuclides. I'm thinking of, you know,
4 curium, neptunium for which SC&A's already
5 agreed that there's not an issue with those
6 radionuclides.

7 **MS. DeMERS (by Telephone):** Well, this is a
8 matter of data completeness and not a matter
9 of whether people were monitored.

10 **DR. ULSH:** I'll get the names.

11 **MR. GRIFFON:** I'm not sure, you know, this
12 question of the, this crops up in many of the
13 pieces we've done. It seems to me after '69
14 there's nothing to look at to verify. That's
15 a concern I have, and you know, there's no log
16 books. There's no, I'm curious to maybe
17 understand this, and I know it was brought up
18 at a previous meeting. I think Gene Potter
19 might have brought this up. That after '71 or
20 whatever year it was. I'm not sure of the
21 exact year. You went to this electronic entry
22 with the data. There was no urine logs, or
23 they just live entered. But I don't know
24 that, I mean, did they have, what types of
25 computers were in place at that point to do

1 live entry or was it card entry or was it, I'm
2 surprised there's no hard copy record at all.

3 **MS. MUNN:** It would have had to be card
4 entry. It was Sperry Rand. That's why I was
5 there.

6 **MR. LITTLE:** I don't think it's quite
7 accurate to say there were no log books after
8 1971 because there were log books clear up
9 into the D&D era for certain things.

10 **MR. GRIFFON:** No urine logs it was saying.

11 **MR. LITTLE:** Well, not that I'm aware of.

12 **MR. GRIFFON:** Right, no urine logs.

13 **MR. LITTLE:** And we looked at log books of
14 various titles. We looked through reams,
15 literally, microfilm, boxes and boxes of
16 microfilm.

17 **MR. GRIFFON:** I mean, those urinalysis logs
18 were very helpful because you had obviously
19 quantitative data to compare against with
20 individuals, but then it stopped in '69 or '70
21 or whatever. And the question is beyond that
22 what happened? Apparently there's no hard
23 copy record to compare against after that.
24 That's your experience. I'm not saying, if
25 it's not there, it's not there.

1 **MS. MUNN:** Speaking from memory not at this
2 site but what was going on in the computer
3 world then, it had to be, you had card decks
4 and mag tape. That's what you had.

5 **MR. GRIFFON:** It wasn't laptops.

6 **MS. MUNN:** Yeah, no laptops and certainly no
7 Blackberrys. It was, but direct entry would
8 have probably been card stock. But also from
9 my memory one didn't maintain cards for a
10 long, long time. After you had, after you
11 transferred them to mag tape, you usually
12 discarded them.

13 **MR. LITTLE:** Yeah, the (inaudible) becomes
14 the record at that point.

15 **MR. MEYER:** The mag tape might still exist
16 at the archives.

17 **MS. MUNN:** Might.

18 **MR. MEYER:** We'd have to re-invent the tape
19 drive.

20 **MS. MUNN:** Yeah, and finding the platform is
21 something else again. If you can find the
22 tape, you can't find the platform.

23 **MR. GRIFFON:** Well, some of the sites
24 certainly had the card data, saved, archived,
25 but I guess we just didn't have it here.

1 **DR. ULSH:** I don't know, Mark, I don't know
2 that we specifically looked for card --

3 **MR. GRIFFON:** You haven't found it I would
4 say.

5 **DR. ULSH:** We don't have it in our
6 possession.

7 **MR. MEYER:** We haven't encountered them. We
8 haven't looked at, I mean, my experience at
9 Oak Ridge was that at that point it would have
10 been line-printed output and the cards by now
11 certainly would have been discarded. It would
12 be just a massive ...

13 **MR. GRIFFON:** So I don't know, you have this
14 log book report. You haven't given us a
15 response to this or did you?

16 **DR. ULSH:** No, we haven't given a response
17 mainly because the conclusion at the end was
18 that they didn't see any SEC issues.

19 **MR. FITZGERALD:** Remember that the charter
20 for the work group was to review what NIOSH
21 had evaluated. We, in fact, did so and based
22 on that scope I think our conclusion wasn't,
23 we didn't see any systemic issues. I think
24 the only asterisk we're adding is that we have
25 some reservations about the record as we've

1 discussed, and we certainly didn't have any
2 information on the way the boxes were used. I
3 think some of this information is now
4 forthcoming. So that's kind of where we are.

5 **MR. GRIFFON:** Which I don't know, you know,
6 that's what I'm looking for is another prong
7 that sort of fills that gap of the '70s and
8 '80s, you know. I mean, it seems like, at
9 least in my experience of what I've seen on
10 post, I'm limited to what I can view
11 obviously, but the log books look like they
12 only go into the early, I mean the Health and
13 Safety reports also look like they, unless you
14 have later ones that go through the '70s into
15 the '80s.

16 **DR. ULSH:** I haven't located any beyond '71.

17 **MR. GRIFFON:** And my experience is that on
18 most of the sites the utility of those safety
19 reports decreases as time goes on. There's
20 more data in the early ones and less data in
21 the later ones. There's more language in the
22 later ones but less data. It's just the way
23 they, yeah, maybe for legal reasons, whatever.
24 But this is not inconsistent with what we ran
25 across at Y-12 actually that we sort of in the

1 '70s we started having difficulty with
2 anything to compare.

3 **MR. FITZGERALD:** Yeah, we can't conclude
4 anything beyond the scope that we looked at.
5 But what we did look at certainly we didn't
6 see a systemic.

7 **MR. GRIFFON:** I guess at this point the only
8 outstanding action then would be for this
9 description of your sampling or review of
10 those 450 boxes, and --

11 **DR. ULSH:** Are you looking for anything
12 further on data integrity and safety concerns
13 or are we --

14 **MR. GRIFFON:** I don't think so at this
15 point.

16 **MR. FITZGERALD:** Not unless the work group
17 directs because otherwise we've been through
18 the review of what you dealt with the 5,000
19 and I, you know, that's the scope, and we've
20 looked at it, and we've applied conclusions.

21 **MR. GRIFFON:** Yeah, I don't think we want
22 any more action there. Taking a deep breath
23 at that point. But the only, you know, other
24 than the scope I think, and you may disagree
25 with me, Brant, on this, but this question of

1 the comparison of the logs versus the database
2 still raises my concern as it applies to the
3 coworker stuff that we're going to run into.
4 And so we've got several prongs that are
5 pointing to this data completeness and
6 coworker models.

7 **DR. ULSH:** I hear your concern, Mark, but
8 what I'm wondering is I haven't looked at that
9 particular section of SC&A's report. I'm
10 wondering if there are individual identifiers
11 where we can see where the HIS-20 data, where
12 Kathy couldn't find it. If we can --

13 Do we have that, Kathy? I mean, you
14 know what you sent over so I mean do we have
15 that kind of information in what you sent over
16 already or is that something we need to
17 request in addition?

18 **MS. DeMERS (by Telephone):** I will send you
19 a key. I don't know if it's available in what
20 you got or not.

21 **DR. ULSH:** So I mean we could take a look,
22 Mark, and see whether or not --

23 **MR. FITZGERALD:** I suspect it is because of
24 Price Anderson. I'm not sure what ended up,
25 you know, in terms of identifiers. I doubt

1 much went over with identifiers, so we'd have
2 to get the key --

3 **MR. GRIFFON:** The Privacy Act.

4 **MR. FITZGERALD:** -- provide a key that would
5 cross walk.

6 **DR. ULSH:** That would be helpful because
7 we'll take a look at that.

8 **MR. GRIFFON:** And again, this number or one
9 of the concluding statements here says 32
10 percent were absent in the HIS-20 database.
11 Now you may want to also look at CER since
12 that's the, your bioassay coworker models is
13 based on CER so you may want to look at HIS-20
14 and CER, right --

15 **DR. ULSH:** Okay.

16 **MR. GRIFFON:** -- or primarily CER? I mean,
17 I'm not, I'm more asking than telling. I
18 think that's what your coworker is based on,
19 CER, right?

20 **DR. ULSH:** The internal coworker data is
21 based on CER data.

22 **DR. NETON:** It's got to be identified.

23 **DR. ULSH:** Oh, that's right, it is, isn't
24 it?

25 **MR. GRIFFON:** It has to be identified.

1 That's the problem. That's why I always have
2 been doing mine in HIS-20, and the only time I
3 can compare against CER is when I have these
4 high values in certain time periods and they
5 stand out. But these were not, if I
6 understand SC&A's report correctly, these 32
7 percent absent from the HIS-20 were not only
8 zeros or thinking that they were high values
9 as well or mid-range values or whatever, it
10 wasn't just simply zeros. It was kind of all
11 over the place.

12 **DR. ULSH:** Keeping in mind that we only
13 covered up to 1970, '71, whatever. I have to
14 look and see whether or not these were people
15 who you wouldn't expect to be there because
16 they weren't injured. When their employment
17 terminated, I guess, is what's going to be the
18 --

19 **MR. GRIFFON:** Yeah. Well, that whole thing
20 is troubling to me, too, that people were
21 taken out and then some were put back in, and
22 we don't know who and what.

23 **DR. ULSH:** Well, they weren't, no, actually,
24 we do know who it was. I mean, they weren't
25 taken out. They were never initially loaded.

1 The people who, I mean, this is described in
2 the evaluation report. The people who
3 terminated prior to that year, whatever it
4 was, '77, something like that, their data
5 didn't go into HIS-20 at all initially. Now
6 later a subset of those were loaded back in if
7 they were in that highest exposed workers that
8 were part of the medical monitoring program.
9 We know that.

10 **MR. GRIFFON:** The highest exposed workers as
11 defined by that later program, right?

12 **DR. ULSH:** Right, that medical monitoring
13 program.

14 **MR. GRIFFON:** That was a semi-voluntary
15 program though as well, right?

16 **DR. ULSH:** Well, I suspect. I mean, they
17 didn't compel people to come in.

18 **MR. GRIFFON:** Right, it was follow up.
19 Okay, I think that, I think we need to, those
20 reports we mentioned previously need to be re-
21 examined and that very short Donna Cragle
22 report has some interesting reading in it to
23 compare. But let's stay on schedule here,
24 4:30.

25 Is there any more on log book analysis

1 specifically?

2 **DR. ULSH:** No, I don't think so.

3 **MS. DeMERS (by Telephone):** No, not really.

4 **SUPER S (TIB 49)**

5 **MR. GRIFFON:** Moving on to Super-S. Joyce,
6 are you still with us?

7 **DR. LIPSZTEIN (by Telephone):** Yes.

8 **MR. GRIFFON:** Super-S, where do we stand,
9 Joe and maybe Joyce can --

10 **MR. FITZGERALD:** Just generally, obviously,
11 we presented back in June at the Board meeting
12 in D.C. the review on the conceptual approach
13 in OTIB-49, and I think certainly the
14 conclusion at that point in time was that we
15 thought that was scientifically valid. We
16 have since proceeded to look -- at the
17 direction of the work group -- look at the
18 case model, the model cases that were
19 included. Was it 25? Twenty-five model cases
20 and Joyce has been evaluating those, and I
21 think - am I right, Joyce, the only issue
22 there was this lung adjustment factor? Are
23 you making headway?

24 **MR. GRIFFON:** Which now you have.

25 **MR. FITZGERALD:** Which I think we got

1 recently, but is that, have you concluded that
2 that's what you need to finish?

3 **DR. LIPSZTEIN (by Telephone):** Yeah, what we
4 got to see just the adjustment factor, but we
5 still didn't get everything because we got the
6 adjustment factors that were used until '95,
7 and from '95 on after '95 we didn't get what
8 were the adjustment factors.

9 **MR. GRIFFON:** Well, maybe you can follow up
10 with Roger or Brant.

11 **DR. NETON:** I thought we sent everything,
12 but --

13 **MR. FITZGERALD:** It sounds like there's,
14 what, seven or eight years, just the tail end
15 that's missing.

16 **MR. GRIFFON:** But I guess the outstanding
17 action is for you to complete this review.

18 **MR. FITZGERALD:** Complete the review --

19 **MR. GRIFFON:** This was the idea to see if
20 the model cases selected were inclusive of the
21 other 25.

22 **MR. FITZGERALD:** Joyce, we're going to
23 pursue this with NIOSH, but I assume though
24 that with the correction factor that you have,
25 you can, in fact, pursue a large number of

1 these?

2 **DR. LIPSZTEIN (by Telephone):** Yes, yes.

3 **MR. FITZGERALD:** Okay, so really just to
4 make sure that we have for those individuals
5 with data beyond '95 you need that additional
6 factor.

7 **DR. LIPSZTEIN (by Telephone):** Yes.

8 **MR. FITZGERALD:** Okay, so you're in the
9 process of going through those calculations
10 now?

11 **DR. LIPSZTEIN (by Telephone):** Yeah, and
12 another point that is not only relevant to
13 these 49, the high fired, if there was, if
14 there is an adjustment factor, they have to be
15 used on all claimants' lung results. And they
16 haven't been from few claimants that were
17 involved in the '65 fire.

18 **DR. NETON:** I don't know that they were
19 using --

20 **MR. GRIFFON:** I don't think they relied on
21 that data.

22 **DR. NETON:** -- the lung analyses for dose
23 reconstruction, Joyce.

24 **DR. LIPSZTEIN (by Telephone):** I'm sorry?

25 **DR. NETON:** We talked about that. We

1 weren't really planning on using the lung
2 measurements --

3 **MR. GRIFFON:** For dose reconstruction.

4 **DR. NETON:** -- the urinalysis was the
5 primary method. Is that right?

6 **MR. SHARFI:** Are you talking about the chest
7 sample?

8 **DR. NETON:** Yeah.

9 **MR. SHARFI:** There's been a little. I would
10 not limit not using the chest sample.

11 **DR. NETON:** Well, I didn't say not use it,
12 but I didn't know that we were --

13 **MR. GRIFFON:** I thought it was discussed
14 that the primary in this case for Rocky you
15 were primarily looking at the urine, and you
16 might use the lung to bound.

17 **DR. LIPSTEIN (by Telephone):** All
18 claimants? No. If you have someone that with
19 a lung cancer, and you have the lung counting,
20 why would you use urine?

21 **MR. SHARFI:** Yeah, I agree. I would not say
22 we would not.

23 **DR. NETON:** Well, I'm thinking about the
24 Super-S issue here though. I mean, I don't
25 know. I need to think about this. At one

1 point we had determined that we weren't going
2 to rely on the --

3 **MR. SHARFI:** On for like Hanford it's more
4 likely to use the urinalysis because it's more
5 sensitive, but and much lower MDA, but the
6 Rocky Flats more often chest count that is
7 more viable.

8 **DR. NETON:** Yeah, but see that's americium
9 there, and if you're talking about plutonium,
10 you can't see the broad side of a barn with a
11 lung counter with plutonium. So I doubt that
12 we would have hardly anyone with a measurable
13 PU-239 burn. I mean, the detection limit's
14 somewhere around a couple hundred nanocuries,
15 easily.

16 **MR. SHARFI:** No, we've seen measurable 239
17 in americiums in some of that Super-S
18 materials so --

19 **DR. NETON:** Well, they'd have to be pretty
20 large lung burdens.

21 **MR. SHARFI:** Yes. Yes, these are big
22 intakes. But the americium will be bounded in
23 the matrix so it will exhibit the same type of
24 biokinetics to the lung that you're going to
25 talk about plutonium too.

1 **DR. NETON:** Well, I don't think that's what
2 we're saying for the Super-S model. We can
3 look at that. We'll take that information and
4 --

5 **DR. LIPSTEIN (by Telephone):** And another
6 thing that was raised actually by Bob
7 Anigstein is that some people they were
8 exposed to fire at Rocky Flats, and that these
9 were not reported. And there was some fires
10 in the glove box that were put out by the
11 workers, resulted in this fire department
12 being notified.

13 And he said that sometimes those
14 people they were monitored, but it was not
15 recognized that they were exposed to high-
16 fired oxides. So when you calculate that
17 dose, if the (unintelligible) is below the
18 detection limit because it was high fired and
19 we wouldn't catch up in the beginning, and you
20 don't recognize it as high fire so you might
21 be unfair to those workers. And I don't
22 really know how you would address this kind of
23 exposure.

24 **DR. NETON:** I thought our default assumption
25 here, unless we can determine otherwise, was

1 going to be high fired for virtually everyone
2 that we couldn't determine.

3 **DR. ULSH:** Well, for lung cases.

4 **DR. NETON:** For lung cases, right.

5 **DR. LIPSZTEIN (by Telephone):** Yeah, and for
6 systemic --

7 **MR. SHARFI:** It'd be one of the solubility
8 choices that you would have to consider in all
9 cases if you could not rule out that scenario
10 by means of --

11 **DR. NETON:** You pick the most claimant
12 favorable in any analysis.

13 **MR. SHARFI:** Yeah, regardless of organ, so
14 it wouldn't be limited to the lung. It'd be
15 all --

16 **DR. LIPSZTEIN (by Telephone):** But would you
17 use high fired even if you did not know it was
18 a high --

19 **DR. NETON:** Yeah, if it's claimant
20 favorable.

21 **DR. LIPSZTEIN (by Telephone):** Okay, then
22 that's fair.

23 **DR. NETON:** Because we recognize it. I
24 think we determined it's not just fires where
25 high fired exists anymore. I mean, there are

1 mechanisms to have high-fired plutonium
2 without a fire.

3 **DR. LIPSZTEIN (by Telephone):** Yes, that's
4 (unintelligible) be exposed to high-fired
5 oxides without being exactly exposed to a
6 fire. And the all these results would be
7 below the detection limit and people would not
8 have been (unintelligible) because either the
9 (unintelligible) or they weren't found --
10 well, for any reason they didn't come up for
11 the (unintelligible) but even though if you
12 treat them not as high fired then it would be
13 unfair, but --

14 **DR. NETON:** Right, we agree. I mean, we
15 would use high fired.

16 **MR. GRIFFON:** Well, the other case, and this
17 came up actually from, I'm not sure it's still
18 related to Super-S, but it is sort of related
19 to this inadvertent sort of unknown exposure
20 question. And the reason it came up for me
21 was reviewing these Health and Safety reports,
22 and then I found that a lot of them were
23 logging the high urine data points, and many
24 of them were associated with wounds.

25 And prior to this, so I tracked this

1 back and found this Chapman document, a health
2 physicist in the early years there, that was
3 tracking some of this. And he raised a
4 question, at least for me, that until the time
5 of his paper, which I think was in the early
6 to mid-'60s, '63, '64, that they had no good
7 method of wound monitoring.

8 They came up with a method to monitor
9 wounds, and he said prior to writing this
10 paper he felt like that the biggest hazard for
11 plutonium doses was inhalation. But he's
12 convinced now that it's wounds. And I
13 actually thought that prior to this that
14 wounds would have been the exception rather
15 than the rule. But apparently these were
16 fairly common to get punctures in the glove
17 box work and stuff.

18 So my question would be if you had an
19 acute exposure from an injection basically
20 instead of an inhalation, is the chronic model
21 going to be bounding? I know we've looked at
22 acute inhalation spikes, and we've convinced
23 ourselves always that the chronic is bounding.
24 But in that situation --

25 **MR. SHARFI:** The dose associated with the

1 wound incident is usually much less because
2 you get so much straight excretion to all you
3 see in high peak in urine so quickly.

4 **MR. GRIFFON:** But is that true for all
5 organs is my question. I mean, certainly --

6 **MR. SHARFI:** Obviously, the lung is not
7 impacted because it's straight to blood. It's
8 going to bypass the --

9 **DR. NETON:** The organ dose is directly
10 proportional to the --

11 **MR. SHARFI:** To the excretion.

12 **DR. NETON:** -- the excretion, right? So you
13 have a handle on that.

14 **MR. SHARFI:** Correct.

15 **MR. GRIFFON:** But if you have non-detect
16 urine then the coworker chronic assumption
17 should still be bounding?

18 **DR. NETON:** I think so. I think --

19 **MR. SHARFI:** Usually inhalations almost
20 always a more claim favorable assumption over
21 wound incident because of the direct injection
22 would cause a quick spike versus the long-term
23 buildup of the, you have a much longer
24 exposure scenario with a, inhalation takes
25 time to get into the blood system or the --

1 **DR. NETON:** I don't want to say too much
2 without --

3 **MR. GRIFFON:** Yeah, I looked at this quickly
4 and that's why I'm asking because I've got to
5 look at it further, too, but I wanted to raise
6 it here so you could also consider that as
7 another, and this is really on the
8 implementation of the internal coworker.

9 **MR. SHARFI:** And there is a wound TIB that
10 covers how to assess wounds.

11 **MR. GRIFFON:** Oh, I didn't know that.

12 **DR. LIPSZTEIN (by Telephone):** Yeah.

13 **DR. NETON:** The NCRP model.

14 **MR. SHARFI:** We have a, ORAU has a, there's
15 an OTIB, I can't think of the number right
16 now, but there's one that does cover wound
17 intakes.

18 **DR. LIPSZTEIN (by Telephone):** Yes, and
19 that's to cover when you have the cancer of
20 the lymph nodes.

21 **MR. GIBSON (by Telephone):** This is Mike.
22 Did I miss on the wound monitoring, did they
23 actually use a wound, or did they use a
24 bioassay sample after the fact of a wound?

25 **MR. GRIFFON:** Well, I think they had a field

1 technique to do both, yeah, both is the
2 answer.

3 **MR. SHARFI:** Yeah, there are reports inside
4 the claimants' files that had the wound
5 counting data and then they also did a lot of
6 full bioassay.

7 **MR. GRIFFON:** But his report kind of says,
8 you know, he wonders how many of these went
9 undetected, and that sort of raised my
10 question of whether, my question is not
11 necessarily a wound TIB because the assumption
12 is wounds happen. But we're looking at the
13 case where we didn't know it was a wound.

14 **MR. SHARFI:** If you want to look up the same
15 bioassay result in an intake from an
16 inhalation versus an intake versus a wound
17 incident, I don't know if the scenario where
18 the inhalation does not give you a bigger dose
19 than --

20 **MR. GRIFFON:** Okay, I got to run --

21 **MR. SHARFI:** You can use that wound TIB to
22 run your scenarios and if you want to test
23 that.

24 **MR. GRIFFON:** Yeah, okay. I just wanted to
25 raise it while we're here so check it.

1 **DR. LIPSZTEIN (by Telephone):** If you assume
2 there was an acute intake and knew there was a
3 wound, and you take the bioassay data, and you
4 go back and everything is okay. When there is
5 no indication that there was a wound, so but -
6 -

7 **MR. GRIFFON:** That's why I questioned that.

8 **DR. LIPSZTEIN (by Telephone):** -- all the,
9 let's say all results were below the
10 detectable limits, and then acute inhalation
11 intake and that will be very unfair to some
12 because if you (unintelligible) it's okay in a
13 short time period, but if you take it for a
14 long time period then it's (unintelligible).

15 **MR. GRIFFON:** Okay, maybe I can ask Joyce if
16 you can look at that as well as Jim or Brant,
17 whoever on your team wants to look at it.

18 **DR. LIPSZTEIN (by Telephone):** I think one
19 of the problems is that the wound model which
20 is being done by NCRP, it's almost ready, but
21 it's not ready yet. So you have the wound
22 OTIB which is good for now, but it doesn't
23 cover everything that you have. If someone
24 has a cancer of the lymphatic system, it's not
25 well covered by this wound OTIB. I think in a

1 short time NCRP is going to publish a model
2 for a wound and will solve everything.

3 **MR. GRIFFON:** So let's, it's on our radar,
4 and we'll have SC&A and NIOSH look at that,
5 but let's move on to our last items. I know
6 we'll be done by 5:00. I know we will.

7 **NEUTRON ITEMS**

8 Neutron issues, I'm going to need your
9 help, Joe to kind of frame it, and maybe Ron
10 can weigh in.

11 **MR. FITZGERALD:** Yeah, this has been a
12 longstanding discussion we've had. And I
13 think there's no one specific fundamental
14 problem with the information that has been
15 provided in terms of how neutron doses are
16 being estimated, just that there were a number
17 of pieces of data and information that we
18 wanted clarified. And I think Brant itemized
19 these very well in terms of five action items
20 that I think the work group's very familiar
21 with. And frankly, at this stage, we've had
22 Ron Buchanan working directly with ORAU to see
23 if we can actually put this to bed because
24 essentially it's information that we need some
25 clarifications, interpretations, corrections

1 and it's sort of a grab bag of different items
2 which, I think at this point, we believe isn't
3 moving in an SEC direction, but we wanted to
4 make sure of that fact. And that's what we're
5 really looking to, from this discussion, to
6 understand if that's the case. So Ron, with
7 that introduction, how does it look?

8 **MR. GRIFFON:** And knowing that we all want
9 to head for the airport.

10 **MR. BUCHANAN (by Telephone):** Yeah, we've
11 been going over this neutron issue and the
12 main thing was two areas I wanted to look at
13 is the proposed procedures, recommended
14 procedures by NIOSH, claimant favorable and
15 workable. They produce reasonable results for
16 the doses assigned. And so that involved
17 reviewing all the OTIBs and procedures and a
18 lot of intertwined documents. And at this
19 point, of course, and then we came along and
20 we had OTIB-58 recently released a week or two
21 ago which was a revision of the earlier one.

22 My review to this shows that OTIB-58
23 has made an effort to do a reasonable coworker
24 dose model, and coupled with the NDERP report
25 and OTIBs-50 and -52 and some others. And my

1 take on it at this point is that I'm trying to
2 clarify where some of the data came from
3 that's entered in the tables.

4 I don't necessarily have a problem
5 with the procedures, and I don't necessarily
6 have a problem with the data. I just have not
7 yet been to all 14, and I'm working with Matt
8 and some of the others and Brant has forwarded
9 some of the answers. I got those yesterday or
10 the day before, and then I just opened the
11 door and received the CD with six megabytes of
12 neutron gamma data on it about an hour ago,
13 and I haven't had time to digest that.

14 And so I know everybody's wanting to
15 close this meeting so what I, my bottom line
16 is that at this point, that SC&A, the review
17 of the recommended procedures indicates that
18 there are no outstanding SEC issues at this
19 point with our understanding of the
20 recommended procedures. Now that hinges on
21 the fact that the data put into these
22 procedures is reliable and adequate. And I
23 did not address all that issue as we spent
24 most of the day on that.

25 At this time I'm looking at the

1 procedures do they, are they claimant
2 favorable, produce reasonable results, and at
3 this time I do not see SEC issues with the
4 recommended procedures and the data I've
5 reviewed today. Now we haven't completed that
6 data accuracy and availability issue
7 completely, but that's where I stand on this
8 point.

9 **MR. FITZGERALD:** Which reflects what we
10 talked about with the coworker model with
11 different prongs we're looking at. So he's
12 been on one prong we've been dealing with.

13 **MR. GRIFFON:** We're looking at the data
14 issue on another prong which we spent a lot of
15 time on.

16 **MR. FITZGERALD:** So it sounds like really
17 easy. The loose end is to look at the data
18 behind the new tables and the new OTIB
19 revision?

20 **MR. BUCHANAN (by Telephone):** Well, actually
21 there's the tables, yes, there's two
22 additional tables in the OTIBs that I'm
23 looking at and also the original tables which
24 you didn't have the data for before. So the
25 four tables I'm looking at, plus there's three

1 additional tables for the construction workers
2 which I have not touched on that aspect
3 because I'm still trying to sort out the
4 regular workers, and I'll get to that after I
5 understand the first tables.

6 And so I have read the response of
7 NIOSH on my questions, 14 questions I think,
8 and I'm reviewing those. And I'm going to
9 send another couple clarification questions to
10 Matt here in the near future and also review
11 the CD and make a decision whether I
12 understand where all the data's coming from,
13 if it looks like it provides favorable
14 results.

15 **MR. GRIFFON:** And I would also request that
16 if need be, you continue some of those
17 technical calls on the neutron issue
18 specifically. I mean, if you need a follow-up
19 call --

20 **MR. FITZGERALD:** Yeah, we're seeing how this
21 goes and --

22 **MR. GRIFFON:** -- in the interim, right.

23 **MR. FITZGERALD:** -- if it turns out that the
24 disk and the additional information is
25 sufficient, I think then we'll just wrap it

1 up.

2 D AND D (TIB 0014)

3 **MR. GRIFFON:** Last but not least, the D&D
4 worker question.

5 **MR. FITZGERALD:** Yeah, I think we had some
6 pretty productive calls on that. Certainly
7 the information provided by Gene Potter in
8 terms of looking at the top tier dose
9 distribution versus the, I guess two sets
10 really, all the subcontractors as well that
11 were identified as the D&D subcontractors,
12 demonstrated the dose distributions were
13 equivalent and could be in fact enveloped by a
14 common coworker model. I thought we were
15 pretty satisfied and thought that kind of
16 addressed the issue we were concerned about
17 most.

18 Really what's left on that issue is
19 the OTIB-14 extension of OTIB-38 which is this
20 whole issue of what's the coworker in it. If
21 you buy into again that distribution, which we
22 do, then how are you going to apply OTIB-38 to
23 the D&D era. That's what OTIB-14 is directed
24 at. And there we spent some time looking at
25 that, in particular --

1 Joyce, are you still on?

2 **DR. LIPSZTEIN (by Telephone):** Yes, I am.

3 **MR. FITZGERALD:** Okay, well, the only
4 question that we come up with that is
5 certainly workers were reviewed from the
6 standpoint of fecal analysis, and some were
7 reviewed on the basis of in vivo counts, and
8 the OTIB isn't very clear on how those would
9 be accommodated within the model. And I think
10 we just got, what, a few days ago, some
11 additional information that Gene put together
12 or somebody put together on that issue.

13 Joyce, have you had a chance to -- I
14 know it's only been a day or two -- had a
15 chance to look at that?

16 **DR. LIPSZTEIN (by Telephone):** Yes, I looked
17 at it, and now I'm going to analyze it. It's
18 basically said that most D&D workers were
19 after '95, and so we don't have to worry too
20 much about the required fecal samples, fecal
21 samples from before '95. So we just have to
22 verify that, and I think now it looks like if
23 it's okay.

24 **MR. FITZGERALD:** Yeah, this is a case where
25 we looked at the concept, went to the

1 completeness of data, and now we're looking at
2 the application so in a way I think this will
3 kind of sew up OTIB-38 and the D&D issue at
4 the same time.

5 **MATRIX UPDATE**

6 **MR. GRIFFON:** Now we come to the matrix. I
7 want to walk through every item -- just
8 kidding. I did want to bring up one specific
9 thing on the matrix, item -- we did edit this
10 matrix so I would ask maybe the work group and
11 all others to read through these final
12 actions. And I left, I usually try to track
13 actions so there should be a little chronology
14 in most of these, and Brant reviewed this as
15 well as Joe and Emily apparently so we have
16 this redacted version.

17 But I wanted to point out on item 18,
18 this is one place where I put a note that it
19 seems like one of these that we might have
20 just kind of forgotten a little bit, or it was
21 inconclusive and I didn't know if we needed to
22 take this any further.

23 Brant, maybe you can give us some
24 background on this one.

25 **DR. ULSH:** Yeah, Joe and I talked about

1 this, Mark, because I noticed that while the
2 phrase that caught my eye was closure not
3 achieved. And this goes back to what we call
4 detailing analysis, and it was related to the
5 concern that was expressed by the petitioners
6 that sometimes workers would leave their
7 badges in their locker and wouldn't wear them
8 at the radiation area.

9 And so it was suggested, and we did
10 some preliminary analyses to look at whether
11 or not you see evidence of tailing off of dose
12 that would indicate that the rate at which a
13 worker accumulates dose or at least that's
14 reflected on his badge, tails off. Now we did
15 some preliminary analyses and presented that
16 to SC&A, and it was our conclusion that we
17 didn't really see evidence of that.

18 And I think SC&A concurred with that;
19 however, they also said that they noted that
20 the sample size was small. And it was. The
21 reason we didn't keep going with that -- I
22 think we discussed it at a working group
23 meeting -- was that it wasn't clear to us that
24 that would really give us a definitive answer
25 to the question.

1 **MR. GRIFFON:** I do remember that.

2 **DR. ULSH:** Because it wouldn't tell you
3 whether or not the worker was actually pulled
4 out of the area or whether his badge was only
5 pulled out of the area. So we decided, I
6 think as a group, to pursue this on some of
7 these other prongs in terms of the safety
8 concerns and the data integrity.

9 Does that pretty much summarize, Joe?

10 **MR. FITZGERALD:** Yeah, I think that's kind
11 of where we left it although I agree that was
12 kind of, you know, that prong was left, and we
13 went, pursued it elsewhere. So it was sort of
14 a loose end, but I don't disagree with that
15 conclusion. We went as far as we thought was
16 useful to go through, and this was maybe a
17 less perfect way of reaching that conclusion.
18 We don't disagree with the analysis at the
19 time.

20 Ron, do you want to add anything?

21 **MR. BUCHANAN (by Telephone):** No, not
22 particularly. We agreed with what was stated
23 by NIOSH. It's just that we didn't feel that
24 you could take those few cases and extrapolate
25 into all the years to all the workers.

1 **MR. GRIFFON:** So my question sort of is do
2 we in our other prongs get at this question.
3 I guess we attempted to. Did we?

4 **MR. FITZGERALD:** We attempted to. I mean,
5 certainly in the work that Kathy did trying to
6 run these individual situations where there
7 were some allegations about workers not
8 wearing badges and what have you. I think we
9 looked at that certainly on the completeness
10 side. It's kind of a, you know, how many
11 prongs do you need in order to put something
12 like that to bed? I don't know. That's kind
13 of a judgment call.

14 **MR. GRIFFON:** And there seem to be ways to
15 possibly get at it. I don't know if we've
16 explored all of them, but if there's people
17 that are, you know, if you scan through the
18 annual summary data, and you see people near
19 the limits, if we have their files already
20 pulled, you know, you might look at if there
21 was any indication, I mean, I see log book
22 indications that people were pulled from
23 areas. It certainly looked like restrictions
24 were applied especially on the internal side.
25 I saw notices of that.

1 **DR. ULSH:** Yeah, and sometimes you'll see in
2 the worker RAD files memos that say that there
3 are work restrictions. I don't, it's nothing
4 I've looked for systematically, but I have
5 seen examples of that.

6 **MR. GRIFFON:** So I don't know, this was
7 derived from an individual allegation? Is
8 that correct?

9 **MR. FITZGERALD:** Yeah, it was actually
10 affidavit issues as well as some of the worker
11 input, but --

12 **MR. GRIFFON:** You mean did they give us
13 specifics of individuals where it happened?

14 **MR. FITZGERALD:** No.

15 **MR. GRIFFON:** No, they just kind of said
16 they thought this practice --

17 **MR. FITZGERALD:** Right.

18 **MR. GRIFFON:** And we haven't seen any --

19 **MR. FITZGERALD:** Not in terms of running it
20 down from safety concerns and data integrity.

21 **DR. ULSH:** And this is on the overarching
22 issues list. This particular issue.

23 **MR. GRIFFON:** Right.

24 **MS. MUNN:** Well, and the other side of that
25 coin actually is how many workers would have

1 been expected to be included in a group that
2 would have done this.

3 **MR. GRIFFON:** Right, how much will that
4 affect the overall class.

5 **MS. MUNN:** Exactly, exactly.

6 **DR. ULSH:** In fact, Wanda, that prods my
7 memory. I did talk about this issue in
8 evaluation for a presentation in April.

9 **MS. MUNN:** I think you did, uh-huh. I think
10 we did go over this.

11 **MR. GRIFFON:** And if we had heard, I don't
12 know that we heard many, many people saying,
13 yeah, this happened all the time. I don't
14 think that's the --

15 **MR. FITZGERALD:** We didn't find evidence of
16 a systemic issue.

17 **MR. GRIFFON:** So I don't know there's any
18 further action we can do here other than that
19 in the matrix I'll note that we tried to pick
20 this up and cover this in the individual RAD
21 file reviews and data completeness and other
22 prongs as we're describing.

23 **MS. MUNN:** At the time I read this, I saw
24 the further discussion by the work group. My
25 instant reaction was, why? I thought we had

1 talked about it already.

2 **MR. GRIFFON:** That was the only, I think we
3 were in agreement on the matrix otherwise.

4 **DR. MAKHIJANI:** The main issue that's come
5 up in this kind of regard was, you know, the
6 going up the zeros in '69 and so on, and we
7 know there was another explanation for that.
8 There was a policy for not reading badges and
9 so on. And we tracked that in a different
10 direction. It did not have the same
11 explanation as that item 18.

12 **MR. GRIFFON:** But I also think Wanda's
13 statement's important in this regard that
14 we've got to consider how much the class could
15 have been affected if this happened a little,
16 a few times or whatever.

17 **MR. FITZGERALD:** Well, I think you had to do
18 a reconnaissance review just to see whether it
19 had any corroborating evidence. We didn't
20 find any, but certainly we wanted to take it
21 seriously and pursued it but didn't find
22 anything.

23 **MR. GRIFFON:** I think that's it on our
24 agenda. I would ask if anyone on the phone
25 has any final thoughts. I know it's getting

1 kind of late in the day, but especially the
2 interested parties from the congressional
3 staff. Any comments?

4 **UNIDENTIFIED:** Could someone keep us posted
5 when that report comes out that was referenced
6 in the last working group call?

7 **MR. GRIFFON:** We will. I think we committed
8 already to any reports that, from here on out,
9 that once they're through Privacy Act review
10 and approved for distribution, we'll get those
11 to you ASAP so NIOSH has that out there on
12 their agenda, and we'll do that for sure.

13 **UNIDENTIFIED:** Thank you very much.

14 **MR. GRIFFON:** Thank you for staying with us
15 all day.

16 **DR. MAKHIJANI:** Mark, is there a scheduling
17 question about wrapping things up that we --

18 **MR. GRIFFON:** Yeah, I guess, I was looking
19 at the calendar, and we now have until May,
20 but if we walk that backwards, I think we
21 really want to get something to the
22 petitioners and the interested parties by the
23 end of March, first of April. That gives
24 everybody 30 days or so. I think the
25 meeting's in early May if I have my dates

1 right, yeah. So given that I don't know. It
2 seems to me that any responses from NIOSH
3 would be helpful if you had them by, what, the
4 end of February?

5 **MR. FITZGERALD:** Yes.

6 **MR. GRIFFON:** Do you think that's, I think
7 data completeness is probably the big --

8 **DR. ULSH:** Let's start with that, the '69
9 section and the data completeness section.

10 **MR. GRIFFON:** Let's try for that. I mean,
11 we're all working toward the same goal here,
12 same end date. And we also have to keep in
13 mind that any final product from anyone has to
14 go through Emily's review. So that's going to
15 maybe slow us down a little bit, but I know
16 they'll turn around things quickly.

17 **MR. FITZGERALD:** Well, we're hoping to get
18 as many sections cleared beforehand.

19 **MS. MUNN:** So are we going to talk about
20 this, are we going to set another meeting
21 date?

22 **MR. GRIFFON:** Well, we have the Board
23 meeting coming up. I thought maybe we'll, if
24 you want to look at calendars now --

25 **MS. MUNN:** No, I was thinking about, this is

1 not going to be, what we've been talking about
2 here today is certainly not going to be ready
3 at the Board meeting.

4 **MR. GRIFFON:** Right.

5 **MS. MUNN:** And so --

6 **MR. GRIFFON:** We're going to have to have
7 something beyond that, but I was going to wait
8 and kind of check in with you guys in
9 Cincinnati at the Board meeting and then say,
10 okay, let's look at our calendars to see what
11 makes sense between February 7th and the next,
12 our next milestone, the end of February I
13 guess.

14 **DR. ULSH:** Probably not February 7th.

15 **MR. GRIFFON:** Probably like the third week
16 in February we'll meet.

17 **MS. MUNN:** Maybe we could do the first week
18 of March. Wouldn't that give us --

19 **MR. FITZGERALD:** That'd be a little tight.
20 See, I'm a little concerned that we have to
21 both accommodate any final changes and go
22 through final tech editing which we didn't do
23 on this one, which we're finding all kinds of
24 glitches. And then certainly make it
25 available to NIOSH for final Privacy Act

1 review so that can then go to the outside
2 world. And the logistics I think we need most
3 of March for is my guess by the time it's all
4 done.

5 **MR. GRIFFON:** Yeah, I think the third week
6 in February, although I'm not really ready to
7 pick a date. I apologize because I know
8 there's the Savannah River classified meeting
9 that I have to be at somewhere in that third
10 week in February. I think it's the 20th and
11 21st, but we haven't pinned it down. But I'm
12 thinking the third week in February. That way
13 if there's any -- does that make sense?

14 **MR. FITZGERALD:** Yeah, I think that --

15 **MR. GRIFFON:** The final changes by any final
16 things by NIOSH then everything, you know,
17 we're shooting for that end of February, early
18 March. And that'll give you guys a month to
19 try and get something out for full
20 distribution to everyone, right?

21 **MR. FITZGERALD:** We're kind of looking at
22 maybe a couple weeks to get it to NIOSH so
23 they have a couple weeks to then make
24 distribution. So I think, really, we're only
25 talking a couple weeks from our side,

1 hopefully.

2 **MR. GRIFFON:** Well, let's look at the third
3 week in February tentatively, maybe toward the
4 --

5 **DR. MAKHIJANI:** Maybe the end of February?

6 **DR. ULSH:** The third week of February for
7 another working group meeting?

8 **MR. GRIFFON:** Yeah.

9 **DR. ULSH:** End of February for whatever
10 responses we're going to provide. Is that
11 what you're --

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

13 **DR. MAKHIJANI:** Well, if there's going to be
14 a working group meeting, presumably since most
15 of the action items, I think, are in NIOSH's
16 court at this time, maybe we should have
17 something from NIOSH so we can actually
18 discuss it.

19 **MR. GRIFFON:** Well, that was the, yeah --

20 **DR. MAKHIJANI:** Well, I don't know.

21 **MR. GRIFFON:** -- I mean, I don't know if
22 it's worth meeting if, you know, until we have
23 these products so that's the question. Maybe
24 we should just do it the last week in February
25 and then you have your sort of almost final,

1 near final product.

2 **MS. MUNN:** We're still planning for the
3 first week of March.

4 **MR. GRIFFON:** I would also say as you --
5 Brant, you've been doing this very well as you
6 complete things certainly get them around to
7 us as you can.

8 **DR. ULSH:** Will do.

9 **MR. GRIFFON:** That's it, right? Anything
10 else?

11 (no response)

12 **MR. GRIFFON:** Meeting adjourned.

13 (Whereupon, the working group meeting
14 concluded at 5:03 p.m.)

15

16

17

1

CERTIFICATE OF COURT REPORTER**STATE OF GEORGIA****COUNTY OF FULTON**

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of January 26, 2007; 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 26th day of February, 2007.

STEVEN RAY GREEN, CCR**CERTIFIED MERIT COURT REPORTER****CERTIFICATE NUMBER: A-2102**