

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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON FERNALD

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THURSDAY
MARCH 7, 2013

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The Work Group convened via
teleconference at 9:00 a.m., Bradley P.
Clawson, Chairman, presiding.

PRESENT:

BRADLEY P. CLAWSON, Chairman
MARK GRIFFON, Member
PAUL L. ZIEMER, Member

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ALSO PRESENT:

TED KATZ, Designated Federal Official

ROBERT BARTON, SC&A

ELIZABETH BRACKETT, ORAU Team

HARRY CHMELYNski, SC&A

STU HINNEFELD, DCAS

KARIN JESSEN, ORAU Team

TOM LaBONE, ORAU Team

JENNY LIN, HHS

JOYCE LIPSZTEIN, SC&A

MARK ROLFES, DCAS

JOHN STIVER, SC&A

MATT ARNO, ORAU Team

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A-G-E-N-D-A

Welcome and Roll Call/Introduction..... 4

Issue 1: Coworker Model for
Uranium Internal Exposures..... 8

Issue 6: Use of Chest Counts to Reconstruct
Th-232 Exposures 1978-1988..... 99

Issue 6a: Worker Placement Issue for Thorium
Exposures Based on DCAS Coworker Model
Employing DWE (1953-1967)..... 138

WG Plans..... 174

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1 P-R-O-C-E-E-D-I-N-G-S

2 9:00 a.m.

3 MR. KATZ: So it's 9:00 now; it's
4 time. So let's get started with roll call.
5 Board Members and then all Agency-related
6 people please speak to conflict of interest as
7 well. And let's get started with the Chair.

8 (Roll call.)

9 MR. KATZ: The agenda for this
10 meeting is posted on the NIOSH website under
11 the Board section, under meetings for today's
12 date. And there are no other papers posted
13 for this meeting. And Brad, it's your
14 meeting, so carry on.

15 Let me just remind everyone to
16 mute your phones except when you're speaking.

17 If you don't have a mute button press *6 to
18 mute your phone and *6 again to come off of
19 mute. Thanks.

20 CHAIRMAN CLAWSON: Okay. I
21 understood that Mark Rolfes isn't going to be
22 here so you're filling in for him, Stu?

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1 MR. HINNEFELD: I am attempting
2 to, to a certain extent. I think I'll be
3 relying on the ORAU participants pretty
4 heavily.

5 CHAIRMAN CLAWSON: Okay. Well I
6 just wanted to kind of make sure if they had
7 somebody designated to replace him so that I
8 pointed my questions towards them.

9 Well, first of all, I think I'm
10 just going to whip out the agenda here and I'm
11 going to turn it over to John Stiver. We've
12 got a few issues laid out. Is somebody trying
13 to talk in?

14 MEMBER GRIFFON: Brad, this is
15 Mark Griffon. I just got on.

16 CHAIRMAN CLAWSON: Oh thanks,
17 Mark.

18 MEMBER GRIFFON: And I have no
19 conflicts on Fernald.

20 CHAIRMAN CLAWSON: Okay, that
21 sounds good. The agenda has been posted on
22 the website there, Mark, and we're just

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1 turning it over to John Stiver and let him
2 start to speak. So John, do you want to just
3 take off?

4 MR. STIVER: Okay. This is John
5 Stiver at SC&A. As all of you realize, it's
6 been over a year since we had a Work Group
7 meeting so a lot of these issues have kind of
8 been languishing on the back-burner.

9 We did -- back in April, a Class
10 was added to the SEC which was based on the
11 inability to perform dose reconstructions for
12 the in vivo thorium measurements from 1968 to
13 1978.

14 And there was basically three big
15 issues that we still needed to look at that
16 might have SEC implications. The first was
17 the TIB-78 applicability for bounding
18 construction trade worker subcontractor
19 exposures. That was discussed pretty
20 intensively back in February of 2012.

21 And the next one was kind of a
22 follow-on on the in vivo thorium during the

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1 later period. There's actually two periods
2 that span about 20 years. The first period is
3 '68 to '77 and that was when the data were
4 reported in milligrams thorium based on kind
5 of a rule-of-thumb algorithm. After that from
6 '78 up through '88, data were reported in
7 actual activity units of the thorium-232
8 progeny, gamma-emitting progeny that were used
9 to estimate thorium-232 lung burdens as being
10 actinium-228 and lead-212.

11 And finally, we had an issue --
12 this goes way back, I believe, almost 5 years.

13 And this was the thorium coworker model to be
14 used from 1953 to 1967 that employed the daily
15 weighted exposure data that had been collected
16 by the HASL, Health and Safety Laboratory,
17 during that period of time. And we had
18 reached a tentative agreement with NIOSH in
19 their Revision 3 of their coworker model back
20 in November of 2010 where they had developed a
21 one size fits all model based on the most
22 highly exposed category of workers for each

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1 building in each year.

2 And we had a caveat on that that
3 conceptually we thought that was a
4 scientifically valid approach given that they
5 had developed an uncertainty methodology based
6 on a peer-reviewed paper by Davis and Strom
7 back in 2008.

8 And so the only thing that was
9 left to be done there was to look at the
10 implementation, really to have enough
11 granularity in the data regarding worker
12 placement to really be able to put people in
13 those buildings in those years.

14 So, I guess we can get back to
15 issue number 1. And this is the suitability
16 of the TIB-78 model for construction trade
17 workers.

18 And as you recall back in February
19 2011, NIOSH had proposed a method where they
20 had taken these, what they call type 50 urine
21 bioassay samples. And it turned out that most
22 of the subcontractors had these type 50 data.

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1 And they were kind of termed special sample.

2 And so the original approach on
3 this, because NIOSH didn't really know what
4 proportion of these type 50s really belonged
5 to subcontractors versus the prime
6 contractors. What they proposed doing was
7 just lumping all the data together, those type
8 50s in with the TIB-78, HIS-20 urine bioassay
9 data and then seeing what kind of an increase
10 was there overall. And kind of used one of
11 these adjustment factors kind of similar to
12 TIB-52, that TIB-52 approach.

13 And there was a lot of discussion
14 about this. There was basically -- NIOSH had
15 indicated there were really three reasons why
16 they didn't get a comparison separately and in
17 turn decided to pool the data. One being they
18 could have done the contaminated samples so
19 would that really be applicable to use in a
20 coworker model obviously. The other would be
21 that there's a small number of samples so
22 outliers could skew the data, have a lot of

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1 leverage. A third being that they really
2 hadn't -- had some data for these coworkers
3 or, excuse me, construction workers, which
4 we're just going to -- we're going to call
5 them subcontractors for lack of a better term
6 at this point.

7 The problem being that these type
8 50 data for the subcontractors have just
9 bioassay date. They didn't have employment
10 date. And of course the only way you can get
11 the employment date in the file -- just how
12 this data is provided and the employment
13 history and so forth. And so you have then a
14 way to really get a handle on what the
15 exposure period might have been.

16 But if you're trying to look a
17 priori at the unmonitored workers or the
18 workers that did submit bioassays that did not
19 submit claims, you're kind of stuck in the
20 position where you can't really define the
21 upper limit of what this exposure period could
22 be.

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1 And so I would direct everybody
2 now to a Word document that was sent around by
3 Ted. Last Friday we had a teleconference
4 call. It was kind of a technical call to
5 clarify some of the issues on this particular
6 set of documents that were provided by NIOSH.

7 And NIOSH had provided an update to TIB-78.
8 This is reviewed in TIB-78, and also a
9 comparison study of the subcontractors to the
10 prime contractors.

11 And so we had some questions on
12 that. And went ahead and sent a set of
13 clarifying questions, sent off to NIOSH
14 towards the end of February. They came back
15 with their responses February 28.

16 We had this teleconference call on
17 March 1. And I went ahead and annotated that
18 and sent it around. I believe Steve sent back
19 a comment, a clarifying comment. But the name
20 of this file is notes from Technical Call 13-
21 03-01 SC&A 13-03-04.doc. If you could all
22 pull that up and kind of follow along on this

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1 because a lot of this is sort of laid out.

2 And if everybody has that open, on
3 the first page really it just lays out the
4 background. On January 24, Mark Rolfes from
5 DCAS submitted these two files. TIB-78
6 Revision 2. And this was updated to include
7 these previously excluded type 50 analyses
8 results.

9 And they also incorporated the new
10 TIB-52 one person-one sample averages, a
11 statistical model for stratified coworker data
12 sets. So there were two big changes there.

13 The second was this Fernald strata
14 evaluation discussion Rev 1. And what they
15 did here was they attempted to do an OPOS
16 comparison to subcontractors to the prime
17 contractors to determine is there really --
18 based on hypothesis testing protocol in TIB-
19 53, was there really a discernible, a
20 significant difference between these two
21 groups. They also submitted some Excel files
22 that were sort of the basis for the OPOS

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1 comparisons.

2 And let me get down to the
3 clarifying questions. It was really, you get
4 down to page 3 and question 2 is really where
5 you get to the substance here.

6 And it turned out that really
7 there just wasn't enough data to do an OPOS
8 comparison. If you take a look at the strata
9 Evaluation Report in Table 1, they have data
10 for 9 years, or essentially -- yes, 9 years,
11 1950, 1969, `71, `72, `73, `81, and then `83,
12 `84, `85. And there's -- until you get up
13 until 1983, you don't have enough data in
14 these subcontractor, enough OPOS data. They
15 look for about a minimum of about 30 or so for
16 statistical analysis.

17 And so at that point NIOSH and
18 ORAU decided we really can't do an OPOS
19 comparison. And so what they then decided to
20 do was take a look at the conclusion of the
21 document. Basically they say, well, we can't
22 really do a comparison so it's kind of

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1 inconclusive. So what we recommend doing is
2 taking a high percentile of the TIB-78 data
3 which now includes these type 50 data. And we
4 believe that that would be sufficiently
5 bounding to cover all the subcontractors.

6 Well, first of all, we tried to
7 look back at the subcontractor comparison and
8 there were about 939, 940 give or take records
9 that were found for these subcontractors in
10 the pre-1986 environment. And that's really
11 what we're concerned with because after 1986 -
12 - remember this is the time period where
13 Westinghouse management came in, took over the
14 M&O contract and they instituted a fairly
15 robust health and safety program, really
16 beefed up the radiation safety program. And
17 from that point on they have the urine
18 bioassay for the subcontractors and for the
19 primes is pretty much in lockstep.

20 But before that we didn't have any
21 bioassay data that was put into HIS-20 for
22 these subcontractors. And so it kind of is a

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1 quandary. What do you do about this? We
2 don't have any records for these guys.

3 And so NIOSH went out to DOE
4 Legacy Management, and actually found some
5 hard copy records for about 140 of them for a
6 group of subcontractors at these different 9-
7 year periods.

8 And so we had to go and question
9 well, is this really all there is and were
10 there any data that could have been -- is this
11 a full set or is there potentially untapped
12 data that are out there. And during the call
13 Stu and Mark kind of clarified that, that
14 really this was all they were able to locate.
15 They had -- and Stu kind of elaborated on
16 this. I don't really need to go into it but
17 the net result is this is what we've got to
18 work with.

19 And so this kind of leads us into
20 the next question. This is really the gist of
21 the -- really the heart of the matter is that,
22 okay, you have this coworker data in TIB-78

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1 and there's like 185,000 individual records
2 here. And there are also I believe, I think
3 there were like 10,400 give or take of these
4 type 50 data. And so these were all combined.

5 And so then we're feeling
6 concerned. How are we going to really
7 determine whether this is actually bounding
8 for the subcontractors? And it's going to
9 become a weight of evidence argument. And we
10 kind of distilled this down to three elements
11 in this weight of evidence.

12 The first one was, okay, to even
13 use these type 50 records we really need to
14 get an idea of what the exposure period is.
15 Now, there's kind of an assumption that these
16 are short-term special samples, probably
17 incident-driven and may be related to short-
18 term exposures but there's really no way to
19 tell that. Because we know a lot of these
20 subcontractors were onsite for years and some
21 of them moved back and forth between the prime
22 and the sub. So it's not quite as clear-cut

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1 as that.

2 And so what we had decided at the
3 last meeting, a year ago, was that Steve would
4 go out and basically do a claimant file
5 sampling and take a look at, okay, we know
6 these people are subcontractors. We're going
7 to look at these claimant files that have
8 these type 50 data and determine, okay, what
9 is really the exposure period we're looking
10 at.

11 And Mark indicated if you come
12 down here on page 4 of the minutes, this
13 highlighted section. They were to go out and
14 do a claimant file sampling and really try to
15 get a handle on what the limit might be on
16 this. And Mark indicated that approximately
17 half of these were -- exposure periods were a
18 month or less and others on the upper bound of
19 the 95th percentile was about 9 months.

20 And so that was one of the things
21 we were really concerned with getting as part
22 of our review. If you could provide that

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1 report or the analysis that was done there.
2 And Mark indicated that yes, they would do
3 that.

4 Another aspect I kind of thought
5 of as I was putting together responses right
6 before the meeting last week was that well,
7 you know, you're adding this type 50 data in
8 to make this model presumably bounding for
9 subcontractors. There's sort of an implicit
10 acceptance, an implicit argument that the type
11 50 data for the primes is indeed
12 representative of the type 50 data for the
13 subcontractors. So really are we comparing
14 apples and apples here, or is there some
15 difference that might result in higher
16 exposures for the subcontractors by virtue of
17 the dirty jobs they were doing?

18 And during the discussions I
19 believe Liz Brackett indicated that sometime
20 in the past few years ago she had done kind of
21 an empirical comparison of the subcontractor
22 to the prime contractor bioassay data. And

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1 what had there -- at least the excretion rates
2 were about -- they were comparable with each
3 other. And so we requested that that be
4 provided as well. And I guess Liz was going
5 to go look into that and see if she could
6 possibly provide it.

7 Then a third thing we thought of,
8 well, you know, when all is said and done what
9 we really ought to do, let's take some sample
10 subcontractors and let's go out and have data.

11 Because we know now we have 940 samples from
12 a group of individuals. Let's look at several
13 of those cases and get a statistically valid
14 sample of these things. And let's do a dose
15 reconstruction based on their data. And then
16 let's take this coworker model, the 95th
17 percentile, and run it through that way and
18 we'll see, hey, how is this model really
19 bounding.

20 And so it was determined we at
21 SC&A, we would come up with some criteria on
22 that which we did. And so I guess we could

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1 kind of talk about that for a minute.

2 We figured that we wanted to get
3 about 20 to 30, and ideally you'd want at
4 least 30 of the subcontractors from the pre-
5 1986 period. We had data. We wanted to
6 definitely have data. We were kind of
7 presuming that an annual exposure is sort of
8 the limiting exposure duration for chronic 1-
9 year exposure.

10 And we tried to select the
11 employees who were active during the
12 construction trade work. Stu had mentioned
13 that there was a period in the 1970s when,
14 because there were very little capital funds
15 available there just wasn't any construction
16 going on. There wasn't any expansion. So we
17 want to look at the -- not, obviously not the
18 very initial construction when there was no
19 exposure potential but periods where there
20 were, for various reasons there might have
21 been an expansion in production. You would
22 have these people being out there working in

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1 areas that were contaminated. So we'd want to
2 if possible look at those years.

3 And then again we did assess
4 intakes based on the conventional dose
5 reconstruction methods and then based on the
6 95th percentile, the coworker model compare of
7 course for all three solubility types.

8 And so that's really what we had
9 in mind. And I'd just ask Stu if you guys had
10 thought of -- or the ORAU team if you think
11 those are reasonable criteria for a DR
12 comparison.

13 MR. HINNEFELD: Which is the
14 criteria you're describing exactly, John?

15 MR. STIVER: It would be, you
16 know, we were talking about doing some sample
17 dose reconstructions using this methodology.
18 And we thought that about -- you'd want to get
19 about 20 to 30 of these pre-1986
20 subcontractors who had data who were employed
21 during the periods of expansion and activity
22 when there was actually more potential for

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1 them to be dosed.

2 And then assess the intakes based
3 on both conventional dose reconstruction
4 methods using their data and then using the
5 coworker model and for all three solubility
6 types and just compare the results.

7 MR. HINNEFELD: Okay. So really
8 we're just going to be comparing excretion
9 data.

10 MR. STIVER: Well, we'd actually
11 want -- not just the excretion data. You'd
12 want to calculate the intakes.

13 MR. HINNEFELD: Okay.

14 MR. STIVER: No, no, it would
15 basically be proportional if we're assuming
16 annual exposure.

17 MR. HINNEFELD: Okay. I don't see
18 a particular issue with that. It seems like
19 that's a comparison that should work.

20 MR. STIVER: Yes, I think it's
21 pretty straightforward.

22 MR. HINNEFELD: If ORAU team wants

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1 to speak up, they can. If someone's speaking,
2 they're on mute.

3 MS. JESSEN: Matt Arno, did you
4 want to say anything on this? Matt, are you
5 on mute?

6 MR. ARNO: Yes, I'm sorry. We
7 haven't done a comparison like this for any of
8 the other coworker studies and I don't
9 actually know what sort of result we would get
10 if we did it even for another side where we
11 have all workers monitored and we picked a
12 random sample of 30 people. There's a lot of
13 variation and you're going to get a different
14 answer if you do a claimant-specific dose
15 reconstruction versus the generic techniques
16 and assumptions that we make in a coworker
17 study. Even if we do it I'm not sure how we
18 would evaluate what the results mean.

19 MR. STIVER: I think what we're
20 really trying to get at is sort of an
21 empirical weight of evidence comparison to
22 say, okay, here's the situation. We really

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1 have some of these people. They have data.
2 And let's take a look at how the coworker
3 model assesses their exposure compared to what
4 we really know. You know, given the
5 assumptions, obviously, that we're going to
6 make, and see if that comes out with a higher
7 value. Basically does it bound their intakes
8 that would be calculated if they did have
9 data.

10 And then you have a better idea,
11 just a better sense that you're going into
12 this for the unmonitored workers with what is
13 going to be a bounding exposure.

14 I guess this kind of gets back to
15 the idea that, is the TIB-78 -- first of all,
16 is it representative? We kind of laid out
17 three aspects of that. And if it is then the
18 upper end of that distribution should cover
19 these personnel. Once you've established
20 that, I would think that you'd be on pretty
21 solid ground.

22 MR. BARTON: This is Bob Barton

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1 with SC&A. Just to kind of clarify what we're
2 talking about, we spent probably the majority
3 of the time at the last meeting on this issue
4 talking about how maybe it's inappropriate to
5 simply compare excretion rates because maybe a
6 lot of these subcontractors were only onsite
7 for a short period of time and if they had a
8 sample right after their work was done, it
9 might have a higher result but that might not
10 necessarily indicate a higher intake.

11 So you know, there was a lot of
12 discussion on that. And we kind of came out
13 that the best way to try to get a handle on
14 the exposure potential of subs versus the
15 prime contractors was to do some sort of
16 claimant sampling and compare the intake
17 rates.

18 And just real quick, a couple of
19 quotes from that last meeting. I'm just
20 reading right from the transcript. On page,
21 the bottom of page 36, Dr. Glover: I think
22 we'd be willing to do it, talking about these

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1 sample DRs and claimant study. I think we
2 want to do it and I was going to offer would
3 it help to take a few example DRs. Mr.
4 Rolfes: I mean that is ultimately what we're
5 getting down to. We could just compare intake
6 to intake. Dr. Glover: Take some of those
7 guys who are -- we can't do it for everybody
8 but maybe we could say that this is some
9 examples of how it would be applied for a guy
10 who had data, and compare how those intakes
11 would have been used if he didn't. And here's
12 what the real intake would have been.

13 And you know, it goes on and on.
14 And at the very end, I mean that was sort of
15 the path forward. On page 142, Mr. Rolfes: We
16 can compare statistically the distribution
17 differences or the total intake differences
18 between the two populations. And then
19 CHAIRMAN CLAWSON: Okay, then it's looking like
20 we've got a path forward for issue number 1
21 here. And one more time, Mr. Rolfes, what we
22 just proposed is to compare the total intake

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1 experienced by the subcontractor to the total
2 intake experienced by our coworker intake
3 model.

4 So I mean that's where we were the
5 last time out. So I guess that's where we're
6 coming from here. We haven't really seen any
7 comparison of the intake potential between
8 these two groups. So it's kind of difficult
9 for us to evaluate how bounding the proposed
10 approach is when we don't even really have a
11 handle on the relative exposure potential
12 between the two.

13 MR. ARNO: Given the amount of
14 data we have I think we may be in a position
15 where we never will be able to make that
16 comparison for most years, especially
17 essentially all years prior to the nineteen
18 eighties.

19 I mean one thing I would like to
20 clarify is that we did not add the code 50
21 data in to support use of the coworker study
22 for subcontractors. We added the code 50 data

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1 in because, during the course of our
2 investigations, we determined that that was
3 the right thing to do.

4 Code 50 can more or less be
5 interpreted as samples taken for some reason
6 other than your routine periodic samples which
7 could be, you know, pre-job, post-job, you
8 know, suspected incident whether it's for a
9 contractor or a subcontractor. You always
10 include that data for all the coworker studies
11 and you always have the distance of the fact
12 that yes, the sample taken immediately after
13 acute intake or immediately after the end of
14 the chronic will have a higher result than
15 some periodic sample that may be taken at some
16 length of time after the intake period
17 actually ended. That's a known conservatism
18 for all the coworker studies.

19 COURT REPORTER: Excuse me, is
20 that Matt Arno who is speaking?

21 MR. ARNO: We need to do dose
22 reconstructions we can, but one of the things

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1 we should do is we should do some similar dose
2 reconstructions or pull them up anyway out of
3 the ones we've already completed for the
4 actual contractor employees so that we can see
5 how well the coworker model fits people whose
6 data is included in the coworker model
7 relative to people whose data is not included
8 in the coworker model.

9 MR. STIVER: So this is John
10 Stiver. I see what you're getting at, Matt.
11 The TIB-78 is not -- certainly didn't do this
12 just to address the coworker issue, but the
13 coworker issue depends on that data. So it's
14 kind of like a sub-element of the
15 applicability of TIB-78.

16 I never meant to imply that the
17 coworker side was driving all the changes that
18 went into TIB-78. But because we have the
19 situation where we've got this group of people
20 and we think they have higher exposure
21 potential. But we really can't tell.

22 I mean we've got this small sample

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1 of guys now, or of samples who are
2 representative of a smaller number of
3 individuals, about 940 of them, and this is in
4 the pre-1986 period over several years. So
5 we're not going to ever come back with a
6 definitive result that we can prove at the
7 95th percentile.

8 But you know what we can do? We
9 can at least give ourselves some assurance in
10 an empirical way that, given a sub-sampling of
11 the people we do have, we're pretty confident
12 that this model as proposed will bound their
13 intakes. That's really all we're proposing
14 here, just some sort of proof of concept, I
15 guess, you know. A weight of evidence
16 argument that you can use to justify this
17 assertion that really isn't that
18 substantiated, it's more of an assumption that
19 this data set is going to be sufficiently
20 bounding for this subpopulation that we feel
21 is probably in the upper tail of the
22 distribution.

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1 MR. HINNEFELD: This is Stu. If I
2 can kind of help frame this from my
3 understanding. I think someone was asking a
4 while ago if that was Matt Arno speaking and
5 it was Matt Arno speaking.

6 But to re-frame the question. The
7 question that you're asking here is, look.
8 We, NIOSH, are proposing that this coworker
9 study with this data set that we have, this
10 large data set is sufficient to do a bounding
11 dose reconstruction for construction workers
12 who are not monitored, because you only need
13 it for people who are not monitored.

14 So let's find a population of
15 construction workers who were monitored and,
16 had they not been monitored, would this
17 coworker bound their exposure? Isn't that
18 kind of what you're -- isn't that where we're
19 going here?

20 MR. STIVER: Yes, Stu, that's
21 exactly where we're going with it.

22 MR. HINNEFELD: Okay. So then

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1 that's the comparison you're looking for. And
2 you guys in your things you delivered this
3 week, kind of conveniently identified a
4 population of it looks like about 12 or 13
5 people, I think maybe 12 with multiple samples
6 for a short period of time in '69 that may be
7 something could be done on that.

8 I don't know what other people's
9 opinions are on this. And in fact I know
10 you've done some work on it in terms of the
11 distributions of the excretion rates.

12 Just speaking out loud here
13 though, I wonder if the sampling dates that we
14 have encompass all or a significant fraction
15 of their employment period. And I don't know
16 of any other way that we would be able to
17 identify their employment period. You
18 understand what I'm saying?

19 MR. STIVER: Right.

20 MR. HINNEFELD: That would be --
21 if you were doing an annual intake for these
22 people, you could make some assumptions that

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1 they worked all year and they were sampled
2 only on these dates, or I guess you could do
3 that. I don't know how --

4 MR. STIVER: I think, Stu, we
5 might have to do that because it's one of the
6 assumptions that's built into the model,
7 chronic annual exposure.

8 MR. HINNEFELD: Right.

9 MR. STIVER: You know, that was
10 one of the reasons. The first aspect was to
11 look at the sampling of the NOCTS to identify
12 what are the distribution of the exposure
13 periods for these type 50 data. And which you
14 had to have at least a feel for what that
15 might be. It certainly appears to be less
16 than a year in almost all cases. But I think
17 we were more comfortable using that assumption
18 of the one-year chronic annual intake.

19 MR. BARTON: If I could ask a
20 question here. This is Bob Barton. Does
21 anyone on the NIOSH side or ORAU side know how
22 many subcontractor claimants are available in

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1 NOCTS who would have at least some bioassay
2 data that could be used to reconstruct their
3 intake? I mean is there only a handful? Is
4 there 10, 20? I mean because that would be
5 one way to go is you pull out those claimants
6 and you can know their employment period, and
7 if they have bioassay data you can do a best
8 estimate intake based on that bioassay data.
9 Then you have a chronic intake rate per day.

10 Then you go and you compare that
11 to what they would have gotten from the
12 coworker model and that's really, that was
13 actually proposed by Sam Glover in the last
14 meeting. I mean that would be one way. You
15 might not get definitive answers because you
16 can only go from the claimant population, but
17 again at least it's some sort of quantitative
18 approach to try to get a handle on this.

19 So do we know how many claimants
20 there are that do have some bioassay data that
21 could be used to reconstruct their intake in
22 the claimant population that are also

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1 subcontractors?

2 MR. HINNEFELD: You're talking
3 about construction subcontractors. Okay.
4 Well, as I understand it, the subcontractor
5 data will not be in NOCTS and so it will not
6 be in their claim files.

7 MR. BARTON: Well, also it was
8 indicated during the technical call that these
9 939 data points that we do have are now being
10 electronically linked to the claimant files so
11 that those claimant files would now have, you
12 know, if they're included in that population
13 of 940 samples then now those bioassay samples
14 would be available for any subcontractors.

15 MR. HINNEFELD: Right. That would
16 be the way to do it and I don't know that we
17 have that result of that yet. That would be a
18 way to identify construction workers prior to
19 1986 who we now have bioassay data for who
20 were also claimants. So I suspect nobody on
21 the phone is up on the progress of that
22 linking. That's what we call SPEDElite

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1 process.

2 But perhaps we can send a message
3 and find out where that is. And presumably
4 the result of that SPEDElite matching would
5 tell us how many of these people who we found
6 bioassay data for are in our claimant
7 database.

8 A quick look at the names from the
9 data you sent this week kind of tells me
10 pretty clearly that none of those people seem
11 to be claimants. But that's -- the easy way
12 to do it though would be to do -- finish the
13 SPEDElite linking and then determine how much
14 data we have. So that would be the way to do
15 that. In that case then we do have the
16 employment history for these people.

17 MR. STIVER: Yes, this is John.
18 Thanks for bringing that up, Bob. That's
19 something Mark had mentioned that sort of
20 implied that there -- or at least some of them
21 were in the claimant population.

22 MS. BRACKETT: This is Elizabeth

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1 Brackett. This doesn't address the direct
2 question that's being discussed but as far as
3 comparing the individual subcontractors to the
4 doses or intakes assessed by the coworker
5 study, the coworker study is an approximation
6 of people's intakes. It's not going to be
7 exact.

8 You know, we put together all the
9 bioassay data and then make the assumption of
10 a chronic intake which is not necessarily the
11 case for all individuals. But it approximates
12 a number of acute intakes.

13 Now, for samples that are code 50,
14 those are specifically meant to indicate an
15 occurrence happened. So those are likely from
16 an acute intake.

17 So I think the comparison would
18 best be served if we assumed that the code 50s
19 were due to acute intakes to look at an
20 individual to see if we did them as an
21 individual case where we have their data those
22 would be assessed as acute intakes rather than

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1 chronic. And so we could take that intake and
2 compare it to what would have been assigned
3 had they had no data and we assigned coworker,
4 in which case we would have assumed a chronic
5 intake. So I think that's the comparison that
6 needs to be done.

7 We don't take the code 50s and
8 force-fit a chronic intake to some period. We
9 just make the assumption of an acute intake
10 and then see what the equivalent chronic
11 intake would have been over their employment
12 period. I think that would be the correct
13 comparison because that would be the way the
14 cases would be done.

15 MR. HINNEFELD: This is Stu. And
16 unless there was a change in the numbering
17 system the code 40 was an incident sample.
18 The 50s was something that was taken off, not
19 on the routine schedule, but apparently not
20 because there was an over incident. Unless
21 there was a change in the naming.

22 MS. BRACKETT: It says something

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1 about follow-up or a special study is what it
2 indicated.

3 MR. HINNEFELD: Right, special
4 studies would be something. I mean these
5 people are not on the routine bioassay
6 program. But an incident that prompted
7 samples usually -- now, that code may have
8 been used sometimes for that purpose but by
9 the eighties there was -- type 40 was
10 specifically an incident sample.

11 MS. BRACKETT: The patterns
12 definitely look like --

13 MR. HINNEFELD: Yes, the patterns
14 look like it. You have end of shift and start
15 of shift samples fairly close together.

16 MS. BRACKETT: But then looking
17 at, for example, the ones in 1969, the people
18 were sampled over a couple of weeks. And it
19 decreases the way you would expect an acute
20 intake to.

21 MR. STIVER: Well, then I guess --
22 talk about that 1969 comparison study we did.

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1 We just did this over a couple of days.

2 And we did pick that year because
3 it did appear as though there was an exposure
4 experienced by the subs that was not
5 experienced by the primes. Now, whether this
6 was -- it looks from the baseline data that
7 they were continuously exposed to uranium but
8 there was at least some kind of -- whether it
9 was chronic or acute there does appear to be
10 some exposure that they experienced, was not
11 experienced by the primes which is why we kind
12 of looked at that data set.

13 And we did compare them, you know,
14 just looking year to year, as Liz said. If
15 you don't know the duration, why, you have to
16 make some assumptions and so it was kind of an
17 annual comparing apples to apples type thing.

18 But we felt this was pretty
19 important, the result there was that the
20 geometric mean in the subs for that period
21 from I believe it was July through October '69
22 was higher than 95th percentile for the

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1 primes.

2 And you know, Harry sent out --
3 and it might be time to take a look at that.
4 Let me pull this up here real quick. So many
5 files open right now. Yes. It's called
6 Fernald 1969 data comparison I sent out
7 yesterday.

8 And I'm just going to read this.
9 The Table 1 you can see comparison of log
10 normal model for '69 subcontractors in HIS-20
11 data. Geometric means for the subcontractors
12 is 25.8, for HIS-20 is 3.99. The 95th
13 percentile of HIS-20 is 21. In that
14 situation, the subcontractors' geometric mean
15 is actually higher than the 95th percentile of
16 the HIS-20 data.

17 Harry, would you like to talk
18 about this a little bit since you did the
19 study?

20 DR. CHMELYNSKI: Well, I think
21 that it's pretty obvious when you look at the
22 set of numbers that they stand out as being

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1 different than most of the coworker samples
2 would be, also higher than what you see in
3 HIS-20 which does include a lot of workers who
4 probably weren't in exposed situations.

5 I don't know that there's any
6 particular reason to talk about the
7 statistical methods. The numbers themselves
8 stand out quite distinctly as being a
9 different population. Why that's true I'm not
10 sure.

11 MR. STIVER: I guess the important
12 thing to take home from this is that this data
13 does show, this comparison shows that there's
14 a particular exposure that involved the subs
15 and not the primes and we couldn't predict
16 those results by looking at only the results
17 of the primes.

18 So one particular year, one subset
19 of the data we just happened to take a quick
20 look at found the situation the coworker model
21 probably wouldn't provide a bounding exposure
22 for this other group.

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1 You know, again, it begs the
2 question obviously well, what other potential
3 exposures are out there for which we just
4 don't have data. I guess that's why we wanted
5 to bring this up during the discussion was
6 that here's an example of just the thing we
7 were concerned with.

8 And I don't know that there's
9 really a solution to this at this point. You
10 know we can do --

11 DR. LIPSZTEIN: John? May I?

12 MR. STIVER: Sure.

13 DR. LIPSZTEIN: When we look at
14 the subs' urine excretion rate since '69 and
15 we looked at '69 because that's the year it
16 started the subs have data from July until
17 October. In particular, in August they had a
18 very high excretion rate.

19 Most of the workers, they had
20 monitoring results for the whole period that
21 they were, you know, from July to October.
22 And so probably they were continuously

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1 employed there. Some of them had also -- '71,
2 the next year that we have data.

3 But anyway, there were 53 results
4 instead of -- if you go through the OPOS it's
5 12. But if you go through the results itself
6 you have 53.

7 In particular, August made us look
8 at the table of results and see oh, something
9 happened here in August. And then we looked
10 at the same period of time for the prime and
11 they didn't have that. So August was, you
12 know, just a normal month. Nobody had very,
13 very high excretion rates.

14 So probably the subs were having,
15 you know, some special job, something that the
16 primes were not involved in. That could --
17 either this or we don't have complete data
18 set. It depends if there was a contamination
19 in the lab because. But I don't think --
20 unless they went to different labs. If they
21 went to the same, you know, if they were
22 measured in the same laboratory there is no

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1 why should we suspect that there was a
2 contamination just for the subs.

3 So, what happens is that this
4 particular month, something that the subs did
5 depended on it too. Also, if you look at the
6 other month they also have excretion rates
7 that are higher than the prime in general.
8 And this you can see by the plots that Harry
9 did using the OPOS and using the whole data,
10 the whole 53 data results that we had.

11 And then we looked, these August
12 results, they were so high that couldn't be
13 predicted by any using the prime and 95th
14 percent. So there is something that can be
15 predicted.

16 What I'm saying is that you can't
17 -- unless there is proof that there was, you
18 know, this was a special case that everybody
19 that was on that particular job that had such
20 a high exposure where the only people involved
21 were the unmonitored subs were not involved in
22 this job, we certainly can't use the coworker

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1 for the contractors for the prime for the subs
2 because they have a different kind of
3 exposure, a different kind of job.

4 And even the 95th percent doesn't
5 satisfy it because you can see from Harry's
6 data that the GM for the subs is higher than
7 the 95th percentile. So, it's -- that's one
8 point that we wanted to make. Is the 95th
9 percent for the -- I don't think so looking at
10 the '69 data.

11 MR. HINNEFELD: This is Stu one
12 more time. And Liz's point awhile ago. Let's
13 think about how this would -- how this data
14 would be used as coworker and then how it
15 would be used if it were an individual's data.

16 The coworker study doing one
17 person/one sample I guess you do essentially
18 an average excretion rate for a person based
19 on their data for that year and that's your
20 one person/one sample data point. Is that a
21 true statement?

22 DR. LIPSZTEIN: We used both.

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1 Harry's work, he used both.

2 MR. HINNEFELD: I'm actually
3 asking the ORAU team.

4 DR. LIPSZTEIN: Oh, I'm sorry.

5 MR. HINNEFELD: When we do a one
6 person/one sample we have a person with
7 multiple samples in a year, do what, an
8 arithmetic average of his data and that's the
9 data point for that one person?

10 MR. ARNO: That's correct.

11 MR. HINNEFELD: Okay. So if
12 that's the case then if we were to treat this
13 subcontractor data set, that 1969 as a -- if
14 that were treated the way a coworker data set
15 would be you would do an arithmetic average of
16 one of these individuals -- and say that's his
17 average excretion rate for the year. And then
18 you would say then you could come up with an
19 intake that would correspond with that.

20 But Liz's point earlier, it's
21 pretty clear and Joyce's point that the
22 highest intakes occurred, it looks like they

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1 occurred sometime in July because they were
2 identified -- samples taken at the end of
3 July. And the same individuals were sampled
4 again later on. And you have much smaller
5 numbers.

6 And so you do not have
7 essentially, you don't have this exposure for
8 these individuals for a year that gives them
9 that average intake rate. You have an
10 exposure in July and then a much lower level
11 of exposure following that to allow those
12 urine data to come down the way they did.

13 So, back to the original request
14 that SC&A made. And I guess I can plead some
15 ignorance here because I wasn't at the meeting
16 last year when this topic was discussed about
17 sample dose reconstruction.

18 It seems like how would we treat
19 these cases might be one thing. But would --
20 have a person with this data, what does the
21 dose reconstruction look like or the intake
22 estimate look like.

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1 And then to Bob's point earlier on
2 of can we finish the SPEDELite linking and
3 identify the larger data set, identify a data
4 set of construction workers with data now
5 linked to them that are claimants in NOCTS and
6 determine -- where we will have employment
7 histories, where we can do something of a dose
8 reconstruction with that bioassay data.

9 So that sounds like possibly two
10 possible things that could advance the
11 discussion a little bit. Am I right or wrong
12 on that?

13 MR. STIVER: Stu, this is John. I
14 kind of see your point regarding what Liz had
15 brought up about the potential for acute
16 intakes.

17 You know, this particular data set
18 does look like there was some sort of an event
19 either in late July or August that caused
20 these people to get an intake that wasn't
21 experienced by the primes.

22 And I can see that assuming you

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1 can't really make the assumption this is a 1-
2 year chronic intake given each of these data
3 points. You would have to use some sort of an
4 averaging. So maybe I would ask Joyce if she
5 thinks that would be a reasonable thing to do
6 to have DCAS go ahead and do some
7 reconstructions.

8 First, these are kind of separate
9 things. The SPEDElite obviously you want to
10 do. But rather than make the same assumptions
11 we would for the coworker model go ahead and
12 fit the data like you normally would for a
13 dose reconstruction.

14 The wrinkle there being if you
15 don't have the SPEDElite connection to the
16 employment information you've got to make some
17 assumptions about when they're taking place.
18 So there will be obviously some professional
19 judgment involved in that.

20 DR. LIPSTEIN: I really think
21 that the first thing to do is to see how
22 representative the prime data are for the subs

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1 even if used in 95th percent. We just looked
2 at '69 and we compared, you know, we only had
3 data from July to October. And we compared
4 the same data from July to October also that
5 was Harry's work for the prime.

6 And we can see that the workers
7 who were exposed in July, August, September
8 and October, most of the workers have high
9 results for all the four months. And in
10 August they have super high exposures. We
11 didn't see that pattern for the prime. So I
12 think that the data we have for the prime is
13 not representative of the subs.

14 And the 95th percent is just, you
15 know, there is no justification of why the
16 95th percent, why the 95th percent would be
17 bounding for the sub when we see from this
18 sample that it's not.

19 And then if we do this comparison
20 for the years we have -- we just have data
21 from -- we don't have data for all the years,
22 but we have one year that it doesn't match.

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1 So why should we assume that the distribution
2 of the subs may be well represented by the
3 prime and use a 95th percent? Why this
4 number, 95th percent?

5 When I looked at the data for '69
6 I clearly see that there were no primes
7 involved in that exposure. Because there is
8 no data that is so high as the others at the
9 same month. And we can see that they started
10 in July and then in August they have a very
11 big explosion. Then it decays in September
12 and October, but doesn't decay to the level of
13 the prime.

14 So for me it's like if you want to
15 use one distribution for the other you have to
16 prove in some place that the 95th percent is
17 really bounding. It doesn't look for me that
18 it's bounding.

19 MS. BRACKETT: This is Liz
20 Brackett. I would just point out that there
21 is one prime whose result is equal to the
22 largest value of the results for the subs in

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1 that time.

2 DR. LIPSZTEIN: In August? It was
3 1,000. There were two workers with 1,000 dpm.
4 There is.

5 MS. BRACKETT: Okay, maybe it was
6 July then. Because there was --

7 DR. LIPSZTEIN: I think it's one
8 hundred and something. And it's close to
9 1,000.

10 MS. BRACKETT: I think it was 450.
11 There is one -- maybe it's the July set, but
12 there was one -- I mean I'm not saying all of
13 them, but there was one prime whose result was
14 equal to the largest sub.

15 DR. LIPSZTEIN: But it's not --
16 you know, it's not the same exposure, not at
17 the same time. In August there was an
18 exposure where the two workers was 1,000. One
19 worker, I don't remember anymore, but 600,
20 400. Many workers was -- there was some
21 exposure situation in August.

22 CHAIRMAN CLAWSON: John, this is

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1 Brad. I'd like to make a comment, please,
2 with this. The reason I asked, the point was,
3 Stu, and I hope that you take this with a
4 grain of salt.

5 I want you to understand my
6 frustration because right now I'm looking at
7 my understanding out of the last Work Group
8 meeting when we were coming here basically
9 NIOSH was going to prove their point. They
10 were going to bring back and show us how this
11 was going to work.

12 And this new rev to the coworker
13 model in my opinion is a step backwards. We
14 still haven't proven what's really out there
15 and how we're going to bracket these people
16 into a coworker model and how we're going to
17 separate them.

18 This type 50 data I've been told
19 for years now and understand, this is going 7
20 years now that we've been doing this work.
21 Actually I was told the other day it was 8
22 years by Sandra Baldrige and I can feel her

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1 frustration on this.

2 This coworker problem has been a
3 big issue. When we get into this type 50 data
4 I've heard no, this is for event-driven, this
5 is going on with this. No, I was told that
6 when the subcontractors started coming in onto
7 the site they didn't have a real place to be
8 able to put them so they put them into the
9 type 50 and they'd sample them as they go
10 through. And this is how we were going to
11 segregate them out. I've heard we're going to
12 pull the type 50 data out, not use the type
13 50, go back in. And to tell you the truth,
14 right now I'm feeling like we're nowhere near
15 where we were supposed to be a long time ago.

16 And there's an awful lot of
17 frustration here because we have actually in
18 my eyes gone full circle with this coworker
19 model here. We're back to basically square
20 one. And with the time frame that we had put
21 into this I'll be right honest I'm pretty
22 disappointed in it.

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1 And I'm sitting here listening to
2 this discussion and to me we are nowhere close
3 at all to where we were supposed to be. We've
4 made some progress but I want you to also
5 understand these -- and Stu, you're probably
6 more aware of this than I am. In talking with
7 the construction trades, these people came in
8 there, a lot of them worked at Fernald for
9 different contractors but they were there for
10 18 to 19 years. And they would go on projects
11 that the primes would not because the prime
12 contractors were responsible for -- their
13 doses were enough that they were getting into
14 it. So big projects, they would come in.

15 But these people also never left.
16 They continued on. They just went from one
17 contractor to another contractor going on.
18 They had no way of having a routine bioassay
19 program or whatever. A lot of it was driven
20 by a job or a project that maybe they may have
21 worked. It's like they said, in the
22 summertime they tried to get some of these big

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1 projects done in the summertime so that when
2 winter and stuff come like that that they
3 wouldn't have these problems.

4 I still have not seen a way that
5 we are going to be able to make a very good
6 coworker model. Now, I don't know all the ins
7 and outs of it and you guys may be able to,
8 but I want you to know my frustration.

9 And I want to go on the record
10 that I'm very, very disappointed. We should
11 have been a heck of a lot further to this.
12 And out of the last Work Group meeting my
13 understanding was we were going to prove that
14 this project, how it was going to work and how
15 it was going to tie everyone that we would be
16 able to do a dose. And what I got back was a
17 new rev to this paper and basically two steps
18 back and we still have to be able to prove
19 that it fits to the workers.

20 MR. HINNEFELD: Well, I appreciate
21 your frustration, Brad, but all I can say is
22 from where we are now. And I don't think --

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1 and I really can't speak to the SPEDElite
2 linking process so I don't know where that's
3 at.

4 MS. JESSEN: Stu?

5 MR. HINNEFELD: Yes.

6 MS. JESSEN: This is Karin. We've
7 checked with Cheryl and this should be ready
8 for you tomorrow.

9 MR. HINNEFELD: So all the
10 SPEDElite will be linked tomorrow and we'll
11 know where the construction workers that are
12 in our database have claims.

13 MS. JESSEN: Well, the linking
14 will begin today and it should be completed by
15 tomorrow.

16 MR. HINNEFELD: Okay. And then
17 the next step will be how many people did we
18 find in the database in the claimants, among
19 the claimants that we just link data to.
20 That's the next, second thing. And then from
21 that we can try to -- how many there are.
22 There may not be that many in which case we

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1 could see what would the dose reconstruction
2 be with these data and compare that to what
3 the coworker model would say.

4 This isn't particularly relevant
5 to anything other than I'd like us to all be
6 able to look at the interpretation of this
7 data the same way. I'm looking now at the
8 data set that SC&A sent with construction
9 workers from '69.

10 They're ordered by date and you'll
11 notice that the crews, the large results,
12 there is one large result in July. But the
13 really large results occurred in a sampling at
14 the end of August, late August, and it's a 50
15 sample which means it was a start of shift
16 sample. And it had been roughly a month since
17 the last bioassay data set out of this crew.

18 So, I think it -- but it kind of
19 indicates pretty clearly is whatever they were
20 doing between July 28 and August 27 there were
21 some really high exposures to this crew during
22 this time. But I don't think I would conclude

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1 that that was particularly an incident. I
2 think that they were in a particularly high-
3 exposure environment for some portion of that
4 month. And then apparently they were in a
5 lower-exposure environment later on because
6 the bioassay data come down. Well, they come
7 down pretty dramatically even in a week. And
8 then additional sampling then at the end of
9 October, or early October is also certainly
10 far lower than -- there are plenty of positive
11 results in there, not trivial results based on
12 numbers that I'm used to. But they're
13 certainly far down from the August numbers.

14 So the exposure patterns is pretty
15 clear from this work. And I would not expect
16 to have the same exposure patterns of a
17 subcontractor crew that quite likely was doing
18 a demolition of -- you know, that's the
19 problem. We don't know what these people were
20 doing. Quite likely they were doing a
21 demolition of something and I wouldn't expect
22 a prime to have that kind of exposure

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1 experience.

2 But a prime would have a chronic
3 exposure experience, be more likely to have a
4 chronic exposure experience over 12 months
5 rather than an experience that was largely
6 episodic but with one large episode. Just so
7 we all look at this in the same way here.

8 MR. STIVER: I guess that's the
9 question though. You have -- is the prime
10 data set then representative of the exposures
11 to these subs, you know, regardless. It may
12 be a short-term exposure to say type F
13 material but that's still certainly going to
14 result in high doses to anything other than
15 the lungs in comparison to the insoluble type
16 which might have been experienced by the
17 primes. So I think we still have that issue,
18 is this really a representative data set.

19 MR. HINNEFELD: Well, I don't
20 think the issue is whether the prime data set
21 is representative. The issue is does a
22 coworker model developed from the prime

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1 provide a bounding annual intake for people
2 who were construction workers. That is a
3 little bit different question than is one
4 representative of the other.

5 MR. BARTON: This is Bob Barton.
6 I'm sorry. Could I ask a clarifying question
7 on that point? Because I wasn't quite clear.

8 When -- let's say you had a subcontractor who
9 didn't have any data. And you know, you have
10 his employment record obviously. And say he
11 was onsite for only 2 weeks in the year. When
12 you apply the coworker model are you then
13 saying even though there's only onsite for 2
14 weeks in that year we're going to assume had a
15 full year of chronic intake based on the
16 coworker model? Or would you only assign it
17 for the days he was onsite?

18 MR. HINNEFELD: I'm not smart
19 enough to answer that. Maybe somebody.

20 MS. BRACKETT: This is Liz
21 Brackett --

22 MR. ARNO: This is Matt Arno.

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1 That would depend on where your Probability of
2 Causation. You could just make the assumption
3 for all year which --

4 CHAIRMAN CLAWSON: Who was that
5 talking?

6 MR. ARNO: This is Matt Arno. I
7 was saying you would assume a full year of
8 exposure if you were doing it as an
9 overestimate with a PoC less than 45 percent.
10 And then you would refine it down to the
11 actual duration if you PoC increased above 45
12 percent.

13 MS. BRACKETT: Well, this is Liz
14 Brackett. The correct way to do it would be
15 to assign the specific dates, the intake over
16 the specific dates of the employment.

17 MR. BARTON: Well, then I guess my
18 response to that would be you can make the
19 argument that a chronically exposed worker
20 over a year is going to have a higher intake
21 of uranium than someone who was only on the
22 site for 2 weeks and had a very short but

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1 high-level intake. But if you're still going
2 to only assign uranium intakes based on the
3 coworker model and so you're only getting
4 uranium per day I think that kind of
5 conservatism kind of flies out the window.
6 Because you still have only assigned him the
7 14 days or 10 days of uranium intake based on
8 -- it's based on the chronic full-year
9 exposure but they're not going to get the
10 full-year exposure intake in that way.

11 MS. BRACKETT: Well, that's why a
12 comparison would need to be done to see what
13 the acute intake might have been versus what
14 the chronic over that same period.

15 MR. BARTON: I agree, I agree. I
16 think we're in agreement.

17 MR. STIVER: Typically that's the
18 way it's done is you do both and then pick the
19 highest. Would that be a correct assessment,
20 Liz?

21 MS. BRACKETT: No. If you --
22 well, if you had the data for the individual

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1 and you knew that they had an acute intake
2 then that's what you would assign. If you
3 didn't know what the exposure pattern was, you
4 could do it that way. But it's all dependent
5 on what data you have, what information you
6 have about them as to what assumptions would
7 be made.

8 MR. STIVER: I guess I can see
9 Bob's point though. I mean you might have had
10 somebody who was unmonitored who was involved
11 in one of these incidents yet they would get,
12 you know, a much lower value for that same
13 period of time.

14 MS. BRACKETT: Well, I guess --

15 MR. STIVER: Certainly
16 underestimate.

17 MS. BRACKETT: I guess one of the
18 issues is, I mean how many people would be
19 expected to be involved in these incidents
20 that weren't being monitored. Since there are
21 a large number of subcontractors that were
22 monitored for this particular case clearly

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1 they knew something had happened so they
2 monitored them. How likely is it that someone
3 would have the intakes equivalent to these
4 people and have no monitoring data?

5 MR. BARTON: Well, I don't think
6 we have the data to answer that question. I
7 mean do we know that this, you know, the
8 subcontractor data we're looking at here for
9 August of 1969. I mean, you know, were there
10 unmonitored people in that population because
11 maybe they only monitored half of them.

12 And to go to something Joyce said
13 earlier, for periods where we don't have any
14 data do we know that incidents -- we call them
15 incidents. Maybe that's not the right word.
16 A special project like a demolition. Do we
17 know that these types of exposure potential
18 which could be very high, do we know when they
19 existed and how do you deal with that when
20 you're applying sort of the one size fits all
21 model.

22 I know the 95th percentile is

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1 being proposed but these types of activities
2 that have the higher exposure potential could
3 have been happening at different times other
4 than this one example that we gave. And I
5 don't know if we have sufficient information
6 right now to be able to characterize that.

7 MR. STIVER: I guess it gets down
8 to do you have the information to put a
9 reasonable bound. In this particular
10 situation it would illustrate that if you did
11 have unmonitored workers that were exposed to
12 that type of -- that particular special
13 project for lack of a better term they would
14 not have been -- they would not be
15 particularly bounding.

16 So that just bumped into the
17 question how many other times could this have
18 happened in earlier times and other years.
19 And one of these people might just not have
20 been monitored. Probably a small number but
21 we don't know. We don't know.

22 CHAIRMAN CLAWSON: Well, this is

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1 part of the problem. And if you remember --
2 this is Brad speaking. If you remember what
3 the construction worker that was in the room
4 with us told us there, he had worked at
5 Fernald for over 20 years. Now, not for one
6 contractor, it was always for different ones.

7 When they would get done with
8 major projects which one of the things they
9 tried to do with a lot of these in the
10 summertime when they were replacing piping in,
11 I can't remember what the name of the process
12 room was or anything else like that.

13 Then they would take one or two of
14 the people would have a sample given and that
15 was it. And they were looking at this as
16 being a representative sample for the rest of
17 the construction workers that were involved
18 with this. So, this probably needs an event-
19 driven. I think I'd call it -- it looks like
20 to me an event or a project, a very hot
21 project just like we do today sometimes. When
22 we get done with a project there's a lot of

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1 times we're submitting bioassay to be able to
2 understand what we went through.

3 MR. HINNEFELD: This is Stu.
4 First of all, these data are -- I'm not going
5 to -- I think there are a lot of arguments by
6 SC&A here that carry some weight. And I can
7 kind of speak -- I don't know that we're in an
8 argument or a debate, or if I'm on the side of
9 a debate or not. If so I'm probably switching
10 sides.

11 But to your point, Brad, these are
12 clearly not end of the job samples because
13 they're spread over 4 months. I mean, they
14 were sampling during the work it seems to me.

15 CHAIRMAN CLAWSON: Yes, they very
16 possibly could. I guess my whole thing is
17 this comes back to one question with me. Are
18 we going to be able to, and this is a thing
19 that I threw out to Mr. Rolfes a very, very
20 long time ago with the construction workers is
21 how are we going to be able to
22 representatively make sure that we can bound

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1 their dose. And to tell you the truth I'm
2 still waiting to be able to see how we can do
3 this.

4 One of the things to me that is
5 very interesting about Fernald. Stu, you'll
6 probably understand. They have so many
7 samples for the workers. It's one of the ones
8 that we've seen the most of. But it was
9 mainly towards the prime contractors. We've
10 got a good data set to be able to work out
11 from them.

12 For the subcontractors and stuff
13 like that I see a very large gap and how would
14 we be able to do it. There's such a
15 difference in my eyes as from the contractor
16 to the prime that I think it would be hard for
17 us to be able to make a comparison. But you
18 guys have proved me wrong before. That's kind
19 of where I see the issue, the crux of
20 everything lying is right there.

21 MR. HINNEFELD: Yes, this is Stu
22 and I don't dispute that at all. I think my -

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1 - I wasn't there in the sixties but my
2 observation in the early eighties was that it
3 was a different -- that subcontractors were
4 regarded somewhat differently than the prime
5 contractors, employees.

6 And so to the point that the thing
7 that always that is sticking with me on what
8 we're talking about. We have -- since we're
9 just talking about this 1969 data an awful lot
10 we have this project where someone decided,
11 you know, maybe we should monitor these
12 people. And so they put them on this bioassay
13 program. We've got some 4 months' worth of
14 monitoring. We don't know how that
15 corresponds to the duration of the job either.

16 You know, did they say right away
17 we should monitor these people or did they
18 work for a while and then they say we should
19 monitor these people? We don't know if the
20 job ended in October and that's why there are
21 no more samples. So there's a lot we don't
22 know about it.

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1 We don't know what the decision-
2 making process was that said this group of
3 subcontractors should sampled. Because I'm
4 pretty sure we have people in the database who
5 look like subcontractors who we don't have
6 data for. So we don't really know who made
7 the decision or what the decision process was
8 for sampling contractors and whether the
9 decision process was constant and uniform over
10 the time.

11 So, I see where you're coming
12 from, Brad. There is a certain amount of
13 question I think about that. And I don't know
14 that those are answerable questions to be
15 completely honest. I don't know who you would
16 ask at this point.

17 MR. STIVER: Well, I guess that's
18 where if it's our main concern -- this is
19 Stiver again. The uncertainty of those
20 questions is just -- we don't have the process
21 knowledge and history necessarily to truly
22 answer those with any degree of confidence.

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1 So that to my mind is why you have to
2 demonstrate that this coworker model will be
3 sufficiently bounding for the -- whatever the
4 highly exposed groups are. And this
5 particular group in '69 certainly would
6 illustrate just the type of concerns we've
7 got.

8 So, I guess the question is where
9 do we go from here. I think it's certainly
10 worthwhile to do some of these comparisons,
11 some example reconstructions, to at least try
12 to get a better handle using the data we do
13 have, really explore that thoroughly. Is this
14 going to be able to answer the question with
15 any degree of confidence.

16 MR. HINNEFELD: Yes, I would think
17 that we can do some of those comparisons and
18 then I think we should have some discussions
19 on our side as well.

20 MR. STIVER: Yes. And so you will
21 have that link-up tomorrow then.

22 MR. HINNEFELD: Apparently they

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1 can link those pretty quickly and they'll have
2 the SPEDELite links done.

3 MR. STIVER: -- an idea what
4 number of claimants are actually able --

5 MR. HINNEFELD: We'll have an idea
6 of how many claimants do we have who were in
7 that -- have data now. I don't know how many
8 it will be and how much data they'll have so
9 we won't --

10 CHAIRMAN CLAWSON: This is Brad.
11 Is SC&A going to be able to have access to
12 this information too?

13 MR. HINNEFELD: Yes, sure.

14 CHAIRMAN CLAWSON: I didn't know
15 if it was in one of your own systems or if --

16 MR. HINNEFELD: It's in NOCTS. I
17 mean the thing we could do is just identify to
18 SC&A which are the claim files.

19 MR. STIVER: Yes, identify the
20 claim files.

21 MR. HINNEFELD: You can find it in
22 there. It'll be in the documents part of the

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1 claim and it'll be under personal exposure
2 information.

3 CHAIRMAN CLAWSON: Well, these are
4 questions we need to be able to answer. And
5 unfortunately these are the questions that
6 I've been requesting for the last 4 to 5 years
7 and have been worrying me about this.

8 And I don't see any way -- somehow
9 we've got to be able to prove this is going to
10 be able to be a bounding or if this is not as
11 we've got two avenues that we can go on this.

12 But I'm going to be really honest. This is
13 coming to the end of the ball game here. We
14 have spent so much time on this and we are
15 nowhere -- we're not anywhere close to when we
16 began on this.

17 So, I really -- when we sit down
18 with this, and John and Stu, I want you to be
19 thinking about this. I want to have a clear
20 path forward when we get done with this of
21 what we're going to do and if we can prove it
22 or not, bottom line. Because this has -- this

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1 has been one of my issues with this. And I've
2 been assured that they have enough information
3 that they were going to be able to build this
4 coworker and that it was going to be
5 representative for the construction trades.

6 I want to go back in the history a
7 little bit of where we have been on this. At
8 one time we were going to task the contractor.

9 Earlier we had enough information we were
10 going to leave the type 50 out and we were
11 going to just put them in with the whole body.

12 We've been through several iterations. But
13 I'm the only Board Member on here so I'm just
14 speaking for myself but I'm telling you we're
15 hitting near the end of the road. This has
16 gone on way, way too long.

17 MEMBER ZIEMER: Brad, this is
18 Ziemer. I just wanted to let you know that
19 I'm on the line.

20 CHAIRMAN CLAWSON: Okay.

21 MEMBER ZIEMER: I've heard a fair
22 amount of this particular discussion. Yes.

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1 So I would hope we could come to closure
2 fairly soon even if we have to separate or I
3 guess it's going to come down to whether
4 there's going to be a separate coworker model
5 for these workers versus the prime. Is that
6 what it would come to, Stu, or not?

7 MR. HINNEFELD: Well, Paul, I
8 think what it would come to is, is there a way
9 to do dose reconstruction for subcontractors.

10 MEMBER ZIEMER: Right, right.

11 MR. HINNEFELD: That's what -- I
12 mean that's the question.

13 CHAIRMAN CLAWSON: And there's one
14 other part to that too, Stu, is if you're
15 going to be able to separate the contractors
16 away from the prime. Because I understand in
17 the earlier years this was kind of a -- that's
18 going to be a little bit of a problem too,
19 that you're --

20 MEMBER ZIEMER: You mean
21 identifying them, Brad?

22 CHAIRMAN CLAWSON: Yes.

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1 MEMBER ZIEMER: I was assuming we
2 could identify them.

3 MR. HINNEFELD: I'm not aware of
4 an issue with that. I would think we should
5 be able to tell who their employer is.

6 CHAIRMAN CLAWSON: Okay. Well, I
7 understood the earlier years there was kind of
8 a problem with that because they weren't able
9 to really, really separate them out. They
10 felt that they had a good idea of how they
11 could separate them out but in the earlier
12 years in some of the programs they weren't
13 separated out that well. So I just want to
14 make sure that that's one of the keys to it
15 that we are able to be able to do. Because
16 they had a good bioassay program from the very
17 get-go of this, but how they brought the
18 subcontractors in and out of that was not the
19 best. So I just want to make sure that that's
20 one key to it that we need to make sure we can
21 do.

22 MR. HINNEFELD: Okay. I'd be

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1 surprised if we weren't able to tell if
2 somebody was an employee of the prime. That
3 would surprise me.

4 CHAIRMAN CLAWSON: Well, and
5 correct me if I'm wrong, John, but one of the
6 other problems was being able to have
7 substantial data. Because one of the things
8 Mark was trying to do was link the bioassay
9 program, this big pot of bioassay with the
10 primes to be able to make a good coworker
11 model for that.

12 MR. STIVER: Yes, Brad, that's the
13 issue of representativeness.

14 CHAIRMAN CLAWSON: Right. This is
15 why --

16 MR. STIVER: -- somebody that
17 doesn't really -- is not really applicable to.

18 And so in my mind the question is, okay, are
19 we going to have enough subcontractor data to
20 characterize their exposures for all the years
21 prior to 1986. I guess that's one aspect of
22 it is the data completeness and the other

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1 being the data adequacy. It always comes down
2 to those two things. The adequacy really is
3 that do you have enough information to really
4 characterize their exposures. Now this is
5 assuming we're trying to do a separate model.

6 MR. BARTON: Yes, John, this is
7 Bob Barton. I think we're talking about kind
8 of two separate things. Certainly if we had a
9 claimant and we had their exposure record or
10 their employment history we could see who they
11 were employed by and say yes, they were
12 probably a subcontractor.

13 But to what Dr. Ziemer said, if in
14 fact these are two completely different
15 populations that need, you know, the
16 subcontractors need a separate coworker model
17 I'm not entirely certain if there's enough
18 subcontractor data out there to really put
19 together a coworker model. And I guess I'd
20 kind of ask, you know, NIOSH and ORAU what
21 their feeling is. It just doesn't, I mean it
22 seems like there's kind of a paucity of data,

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1 at least what we have so far, of actual
2 subcontractor results that we can identify as
3 subcontractor results.

4 And I guess I'd ask if it came
5 down to making a separate coworker model and
6 that the current prime coworker model was not
7 representative. I mean would we even be able
8 to do that?

9 MR. HINNEFELD: Well, this is Stu.
10 That's why I asked it as saying that I think
11 the question is whether we can do the
12 construction, you know, do dose reconstruction
13 for the construction people. Because just on
14 the face of it from looking at the numbers we
15 have so far most of the years we don't have
16 any construction contractor bioassay. So, me,
17 I don't know that we would have a lot of
18 confidence to that.

19 Now, there is the question of the
20 '83, '84 and '85 where there is actually a
21 fair amount of construction. We do have a
22 fair amount of contractor bioassay. I mean

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1 there might be a question about those years
2 but prior to that it seemed to me that it
3 wouldn't be much point in trying to build a
4 coworker data set.

5 MR. STIVER: There's only 9 years
6 of data, you know, 940 samples in total.

7 MR. HINNEFELD: And most of them,
8 I mean I don't think any of those years until
9 you get to maybe '83, I mean it's 30
10 individuals.

11 MR. STIVER: Yes, yes. They're
12 definitely underrepresented in those earlier
13 years.

14 MR. HINNEFELD: So, you know, to
15 me I don't see a lot of possibility of a
16 coworker model with the possible exception of
17 the '83, '84, '85, or whenever the later years
18 of the period we're talking about. Because I
19 just don't see a lot of -- it doesn't seem
20 like it's going to work.

21 I do agree, Brad, that we've got
22 to be toward the end of the game on this.

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1 CHAIRMAN CLAWSON: Well, I just,
2 and I apologize if I seem a little bit rash.
3 I just, you know, if you go back into the
4 minutes. And Paul, you go back 4 years, you
5 know. We were talking about a lot of this and
6 how much information and if we were going to
7 be able to do this.

8 So I don't mean to be rude in any
9 way, it's just we're pretty well to the end of
10 the road on this. So we've got to make a
11 decision of which way we're going to be able
12 to go and go with that.

13 Because I look back at the
14 revisions that we have done to this and I
15 understand that we're all trying to get to the
16 same point and different aspects. But we've
17 gone through quite a bit on these and we're
18 just getting to the end to where we've got to
19 make a decision one way or the other.

20 MEMBER ZIEMER: And this is Ziemer
21 again. I think your request for a clear
22 delineation of the path forward, Brad, makes

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1 sense. And perhaps a couple of these
2 questions could be answered fairly soon.

3 Can we identify the worker
4 population for the sub-primes, and also can
5 you even build a coworker model for them yea
6 or nay. And when will we know the answer to
7 those. Those would be helpful.

8 CHAIRMAN CLAWSON: Yes. And one
9 other thing is that I've always noticed in
10 this is that we tried to take the prime
11 contractor and use their bioassay to offset
12 for the subcontractor. And I don't think that
13 we can with that. We see too much of a
14 difference between the two. You know, these -
15 - you know, you're right, Paul, but we've got
16 to have a path forward. So, and I'm not that
17 smart to figure this one out. But I guess
18 that's what I'm expecting from both sides here
19 is a path forward on this. And I think it
20 kind of falls into NIOSH's lap right now where
21 and what they're going to do.

22 MR. HINNEFELD: This is Stu again.

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1 CHAIRMAN CLAWSON: Yes.

2 MR. HINNEFELD: So far the things
3 I have are can we -- well, (a) can we build a
4 subcontractor coworker -- and whether that
5 would be for -- prior to '86 or whatever. Can
6 we identify which claimants are employees of
7 the prime versus employees of the
8 subcontractor.

9 And then the comparisons we talked
10 about earlier, after the SPEDElite linking,
11 combining construction workers with some
12 bioassay now and see what their bioassay would
13 tell you about a -- a dose reconstruction
14 versus what the coworker model would tell you.

15 Also, to do some looking at the
16 1969 data into what, given the actual data
17 that we have there, what does the intake
18 assessment look like for those workers. I
19 don't know that that's going to be terribly
20 illustrative but it's something that could be
21 done.

22 MR. KATZ: Okay. This is Ted.

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1 Just another thought while you're on. And I
2 don't know if this applies or not, but several
3 times, Stu, you or others have mentioned that
4 there was a period early on I guess, or I'm
5 not sure when, or multiple periods, I don't
6 know which, when there really wasn't exposure
7 potential because the buildings were being
8 built, not operated yet. So, if you get to
9 the point where you can't do a model you also
10 need to delineate when exposure potential
11 began for these subs.

12 MR. HINNEFELD: Right. I mean
13 that would -- I mean when they were building
14 the facilities new you're talking about, what,
15 '50 to '52 probably.

16 MR. KATZ: Oh, okay. So that's.

17 MR. HINNEFELD: Yes.

18 MR. STIVER: Yes, that was like in
19 the seventies where there was not much
20 activity going on.

21 MR. HINNEFELD: I think there will
22 be sort of a natural selection that there

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1 probably were not very many -- contractors
2 until they start remodeling things. And so
3 there wouldn't be very many claimants for
4 those years that were construction
5 subcontractors. So I mean that to me is sort
6 of naturally selecting.

7 MR. STIVER: It would kind of be
8 self-selecting, wouldn't it?

9 MR. HINNEFELD: Yes.

10 MR. ROLFES: Stu, this is Mark.
11 Are you able to hear me?

12 MR. HINNEFELD: I am.

13 MR. ROLFES: Okay. I was able to
14 step out of the room where we have all the
15 jurors here. I'm on jury duty today. But
16 I've been listening along and I'm able to --
17 and I've been looking through the Site
18 Research Database. And I have found a couple
19 of references that explain the work that the
20 subcontractors with the high urine excretion
21 rates were doing.

22 There's a document in the Site

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1 Research Database, it's 99708 and it describes
2 some of the contaminated ferrous iron scrap
3 metal that was taken from Fernald in 1969 and
4 then I believe processed offsite. It might be
5 worth taking a look. I haven't looked at it
6 in too much detail but I did want to point
7 that out since there was a concern about the
8 exposure specifically in 1969.

9 CHAIRMAN CLAWSON: So you're
10 saying that it was from scrap metal that they
11 were doing?

12 MR. ROLFES: Yes, correct. It was
13 a subcontractor company. I looked at a couple
14 of the bioassay results that SC&A had
15 identified as being elevated and it looks like
16 those individuals worked for the subcontractor
17 I. Deutsch & Sons. And that company was
18 involved in the processing of some ferrous
19 scrap metal that was contaminated. It looks
20 like they might have went in and got some of
21 the contaminated process equipment and then
22 taken it offsite to basically I guess

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1 decontaminate and then sell the materials for
2 scrap value.

3 CHAIRMAN CLAWSON: Well, with that
4 kind of an uptake that would be interesting to
5 watch in decon. But you know what that brings
6 to my mind about that is I'd like to see what
7 the people got that ripped that equipment out
8 of there before this scrap company came in.

9 These are all issues that we need
10 to get to and I appreciate you weighing in on
11 that, Mark.

12 MR. HINNEFELD: This is Stu. I
13 just sent -- Mark had sent, as I see he sent
14 me an email with that SRDB number and I have
15 forwarded that to Brad, Mark and Paul and John
16 Stiver. I don't have all the email addresses
17 for your attendees, John.

18 MR. STIVER: Okay, I'll go ahead
19 and send it on to the rest of my crew.

20 MR. HINNEFELD: I just read this
21 over the phone.

22 MR. ROLFES: Thank you.

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1 MR. STIVER: Thanks, Mark.

2 MR. BARTON: I think that still
3 kind of begs the question if we can identify
4 all of these such projects and then you could
5 come up with a way to bound the dose for those
6 specific projects, if we had all of them that
7 would be good.

8 But that's not really addressed,
9 you know, one size fits all coworker model
10 because we're still applying doses from the
11 entire worker population. So you have these
12 workers who were exposed to these specific
13 activities and you have some monitoring data.

14 Maybe you don't have monitoring data for
15 everyone who was involved in that activity so
16 eventually you're going to be put in a
17 situation where you have to apply some sort of
18 uranium intake to these workers who maybe they
19 were involved a short time doing this decon
20 work.

21 Again, how representative is the
22 proposed approach going to be for that kind of

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1 situation? I mean if we had modified it, if
2 we knew every single such activity we could
3 sort of I guess put it on a little extra for
4 the subcontractors for those specific time
5 periods.

6 But again, if you're just doing a
7 chronic intake model and you come across an
8 unmonitored worker who was involved in this
9 you may not be applying a claimant-favorable
10 intake based on the current method. I'm not
11 saying you aren't. I mean maybe the 95th
12 percentile actually does bound some of these
13 activities but maybe it doesn't. I don't
14 think that's actually been demonstrated yet.

15 MR. STIVER: I think the
16 uncertainties involved in trying to subsume
17 the subs into the prime data is kind of a big
18 issue which has been prompting this kind of
19 second look at whether it's possible to
20 actually build a separate model for these
21 subcontractors.

22 CHAIRMAN CLAWSON: Well, that's

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1 the question for the day. I think, you know,
2 we can beat this around all day long but where
3 we're at is we've got to plan a path forward.

4 We may not be able to do it by this time and
5 we've got a few more items that we can go
6 over. But before we leave today I would
7 really if possible like to have a clear path
8 forward and exactly what we can do on this.

9 Looking at, and I'm -- I can just
10 look at part of it, but boy, I'll tell you
11 what. Looking at this construction worker
12 information I think we're going to be very,
13 very hard-pressed to be able to do anything
14 there. But I've been proven wrong. But I
15 guess my question is do we want to discuss
16 what our options are and a path forward right
17 now or do we want to take a little time and
18 think about it, proceed with some of these
19 other points.

20 MR. STIVER: I would say we should
21 probably get some actions out of this. Would
22 it be possible to take about a 5-minute

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1 comfort break here before we do?

2 CHAIRMAN CLAWSON: We're all at
3 home, we've got mute. No, yes, I think we
4 could.

5 MR. STIVER: Okay, thanks.

6 CHAIRMAN CLAWSON: Is that right,
7 Ted?

8 MR. KATZ: Yes, that's good.
9 That's good. I was going to suggest the very
10 same thing. So, I'm right in there with you,
11 John.

12 MR. STIVER: All right, thanks.

13 CHAIRMAN CLAWSON: Okay. So we'll
14 -- while we're on our comfort break let's be
15 thinking of a path forward. So, okay. We'll
16 come back in 5 minutes then.

17 (Whereupon, the foregoing matter
18 went off the record at 10:36 a.m. and went
19 back on the record at 10:47 a.m.)

20 MR. KATZ: So, reconvening after
21 the break. Brad?

22 CHAIRMAN CLAWSON: Yes. Okay,

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1 sorry. Well, we're still -- I think that's
2 more that just joined us.

3 So, I guess my question here is
4 what do we need for a path forward on this. I
5 guess I'd like to talk with Stu and John of
6 what we need for a path forward to be able to
7 come to a resolution on this.

8 MR. HINNEFELD: I named four
9 things that we needed to do. I think the
10 fifth maybe that you're looking for that I
11 didn't name might be essentially a description
12 of the logic that leads us to the conclusion
13 that -- there was comments made today about
14 different types of exposures and how are you
15 going to do this. The logic that leads us to
16 the conclusion that the coworker model which
17 is built from essentially the prime employees,
18 the logic that leads us to the conclusion that
19 that coworker model is sufficient bounding,
20 will provide a sufficient bounding dose
21 estimate for construction workers. So to me
22 that would be the other item.

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1 CHAIRMAN CLAWSON: Right.

2 MR. HINNEFELD: And other than
3 that I don't know of other items that have to
4 be done. Now, as any of this stuff gets
5 prepared we can certainly make it available
6 for review by the Work Group and SC&A rather
7 than wait till we meet again before anybody
8 sees it. And there may be --

9 MR. STIVER: I would certainly
10 want to do it in parallel.

11 MR. HINNEFELD: There would be
12 some room for technical calls as they arise,
13 if the need arises.

14 CHAIRMAN CLAWSON: John or any of
15 the SC&A group, is there anything else that
16 you see at this time or feel that we would
17 need more of?

18 MR. STIVER: I think what Stu
19 mentioned pretty well covers the suite of
20 activities that we actually could perform.

21 I would ask Joyce or Bob if
22 there's anything else that they wanted to add.

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1 MR. BARTON: No, John. This is
2 Bob. I think we covered a lot of the bases.
3 And just, you know, we've got to try to -- I
4 mean I think maybe it's overblown that this
5 coworker model, we're not saying right out
6 it's not representative. I think what we're
7 saying is there hasn't been an analytical
8 approach adopted yet to try to get a handle on
9 what the exposure potentials of subcontractors
10 were.

11 And you know, in the latest
12 revision, essentially what's being proposed is
13 we're going to give the 95th percentile. But
14 again, there's no real quantitative basis for
15 that number. So I think that that's really
16 what we need to try to get at if we're going
17 to kind of solve this as an SC&A issue.

18 We need to say whether this
19 coworker model can be applied in such a way
20 that it's going to bound the exposures of
21 subcontractors. And I think that's where
22 we're at.

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1 MR. STIVER: Yes, I think all
2 these things are going to kind of get to that.

3 I like that last item number 5 which was to
4 really kind of identify the logical sequence
5 that results in the assertion that that model
6 really is in fact bounding.

7 But yes, that's really where we
8 stand. We have a model. SC&A is -- I'm not
9 saying that this model is not representative
10 and acceptable. We have pointed out some of
11 our concerns, some anecdotal examples where we
12 can definitely say that at least in this
13 particular case it's not. And so where do we
14 go from there.

15 CHAIRMAN CLAWSON: Now, one of the
16 questions that I have is this coworker model
17 that we're looking at right now is for the
18 construction workers. What -- for the prime
19 do we need to have a coworker model? Because
20 I thought in the earlier years that this is --
21 that we did. Because I thought we had some
22 people that were not monitored and also ended

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1 up showing up with uranium in their --

2 MR. STIVER: Yes, Brad, I think I
3 can speak to that. It was one of the first
4 items that we addressed in these SEC
5 deliberations was the -- actually there were
6 two things. One of them was the completeness
7 and adequacy of the HIS-20 database and the
8 other was the TIB-78 as applied to the prime
9 contractors.

10 CHAIRMAN CLAWSON: Right.

11 MR. STIVER: And we determined
12 that it was in fact adequate. Most of the
13 people were in fact measured. I believe it
14 was like 90-plus percent, there is a small
15 pool of primes to which this coworker model
16 would apply. But we had already made the
17 determination that that was an acceptable
18 model.

19 CHAIRMAN CLAWSON: So we do have a
20 coworker model for the prime though.

21 MR. STIVER: The wrinkle there is
22 that Rev 2 has a new approach to assessing the

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1 doses, using the OPOS methods and new exposure
2 intervals. And so we are, recall that we are
3 tasked to review that.

4 CHAIRMAN CLAWSON: Right.

5 MR. STIVER: We have -- actually
6 the subs issue was kind of subsumed within
7 that review.

8 CHAIRMAN CLAWSON: This is where I
9 get confused with the subcontractor and the
10 prime on this. It was a little bit there. So
11 I just, I want to make sure that we -- as SC&A
12 that we don't, that you don't miss that one.
13 I thought that we had agreed on it but I
14 wanted to make sure.

15 MR. STIVER: But this is a new
16 revision so we have to do the due diligence of
17 reviewing that particular document as well.

18 CHAIRMAN CLAWSON: Okay. With
19 that I guess I'll pass it back to you, John,
20 and we'll proceed on.

21 MR. STIVER: Okay. The next issue
22 was 6b which was the use of the chest counts

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1 to reconstruct thorium-232 exposures in the
2 1978 to 1988 time frame.

3 And Bob Barton and Joyce did the
4 yeoman's job in doing a very comprehensive
5 completeness and adequacy assessment for that
6 data set. And so Bob, if you don't mind I
7 would kind of like you to give the
8 presentation on your report and the main
9 findings and kind of the highlights of what we
10 found.

11 MR. BARTON: Sure, John. And I
12 think there's also a response from DCAS on the
13 work that we haven't seen yet so I'll kind of
14 just go through and say what we find. And
15 DCAS, maybe they have some preliminary
16 responses or something along those lines.

17 The actual report that I'll be
18 referring to is called "Completeness and
19 Adequacy of Thorium In Vivo Records: 1979-
20 1989." Does everybody have that available to
21 them? Because it would probably be helpful to
22 kind of be able to look through the tables and

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1 such as we're going through it. So does
2 anyone have a problem accessing that report?

3 CHAIRMAN CLAWSON: I'm just
4 bringing it up now but you can go ahead and
5 go.

6 MR. BARTON: Okay. Sure, okay.
7 As John said we're looking at thorium in vivo
8 records in the 1979-1988 time frame. This is
9 sort of the second time frame where we looked
10 at looking at in vivo records to create a
11 coworker model.

12 The reason we kind of split it up
13 into the two is because in the prior period
14 which was 1968-1978 the reporting convention
15 was to report in milligrams of thorium. And
16 in this later period which we're going to
17 discuss right now they switched the reporting
18 convention from milligrams of thorium to the
19 thorium daughter products lead-212 and
20 actinium-228 which is measured in nanocuries.

21 So that's kind of the reason that was split
22 up.

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1 Now, important to know about this
2 later period. Aside from 1979 it appears from
3 multiple sources that much of the actual
4 processing of thorium had ceased. There was
5 definitely some processing in 1979. So most
6 of the exposure potential in this later period
7 was probably related to stewardship activities
8 such as there was a problem onsite with drum
9 deterioration. The bins that were holding
10 them were often outside and those kind of
11 deteriorated. So they often had to go in and
12 repackage that thorium material.

13 We also, we did a pretty extensive
14 search on the SRDB to see, just to really kind
15 of characterize what sort of exposure
16 potential there would have been to thorium at
17 this time. And there are some indications
18 that maybe there was some small-scale kind of
19 one-off thorium processing campaigns after
20 1979 that could be taken into account.

21 I think a lot of what we looked at
22 when we tried to kind of establish exposure

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1 potential is to say, well, is there any. And
2 I believe Section 3 of the report kind of
3 speaks to that. While we found some
4 production orders for thorium after 1979 and
5 certainly there were some concerns about the
6 drums deteriorating so there was some
7 repackaging going on throughout the nineteen
8 eighties.

9 And I guess, you know, I don't
10 want to get too specific into that because I
11 don't think it's necessarily conducive to
12 discussions today. But my takeaway from that
13 is there is some exposure potential and so
14 there's obviously a need for a coworker model
15 that can bound the potential doses to workers.

16 And I think that's kind of implicitly agreed
17 upon since NIOSH and ORAU have put forth the
18 coworker model so they are -- I think we're
19 all in agreement that there is some thorium
20 exposure potential. So I kind of put that
21 section in just to kind of give the reader
22 some clarification as to what was going on and

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1 what we're really looking at.

2 One of the main aspects that I
3 think everyone should keep in mind is that
4 similar to the earlier period we evaluated you
5 really can't identify which workers were
6 involved in the re-drumming or any of these
7 potential small-scale operations.

8 So I think one of our sort of
9 overarching findings of this is just if you're
10 going to implement a coworker model such as
11 this to cover it and you don't know which
12 workers, you know, in this data set which
13 records are representative of those workers
14 you just want to kind of assure that whenever
15 you apply the coworker model that you're going
16 to be bounding to this group of workers who
17 handle thorium. You know, you don't really
18 know necessarily what the results are. So
19 when you apply a coworker model like this you
20 just want to assure that the number you're
21 assigning is going to cover that. So that's
22 kind of one of our main findings there.

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1 And kind of to start at the end
2 and then I'll kind of work through the
3 evidence. Bottom line from a completeness
4 standpoint is we do not see any reason that
5 this data set could not be used in such a
6 manner as to bound doses to the potentially
7 exposed claimants. And there's a couple of
8 reasons for that which we can certainly get
9 into now.

10 I think as kind of an overarching
11 finding when you look at the data set as a
12 whole 95 percent of the monitored workers
13 never had a result above the MDA for either of
14 these daughters. So there's a whole lot of
15 the data that we're using that is not an
16 actual positive result.

17 This is kind of further emphasized
18 by 98 percent never had a measurement for both
19 daughters at the same time. So in other words
20 95 percent of the population may have had a
21 positive result for actinium and a less-than-
22 MDA result for lead. And if you want to go,

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1 well, who had positive results for both now
2 you're only down to less than 2 percent of the
3 monitored population.

4 So the records are actually, you
5 know, most of them are below the MDA which I
6 guess doesn't really matter when you're
7 looking at a coworker model because the data
8 is uncensored so you're still going to take
9 those less-than-MDA values and use them to
10 kind of build your intake.

11 Kind of moving onto the actual
12 completeness analysis which is sort of my half
13 of this and then I'll turn it over to Joyce to
14 talk about adequacy.

15 We kind of looked at four main
16 facets from a completeness standpoint.
17 Temporal gaps. In other words, when we look
18 at the data are there large sections that we
19 don't have any measurements taken. We usually
20 look on the order of years but I can tell you
21 from going in I mean usually the gaps were on
22 the order of more maybe 5 months at most. So

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1 that's one facet, do we have data throughout
2 the period we're trying to cover.

3 The second one is was there a
4 potential bias to a job site. For example, if
5 only the secretaries or very low-exposure
6 potential jobs are the ones constantly being
7 counted well then maybe you have a potential
8 problem because you're just going to be
9 missing all the actual workers who had
10 exposure potential.

11 Along that same line we looked at
12 it by plant area which is pretty convenient in
13 these in vivo records because they do list in
14 almost all cases what that person's job title
15 was and what plant they were working in at the
16 time of the measurement. So what we have is
17 the temporal, job site, plant area.

18 Then the last one we looked at is,
19 all right, let's look at this 2 percent of the
20 monitored worker population that had positive
21 results. How frequently were they monitored?

22 I mean, were they the same? Did they have a

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1 positive result and then years later they were
2 finally measured again, or did it seem like
3 there was a focus on those workers who had a
4 positive measurement? Were they brought in
5 more frequently for more counts? Which is
6 obviously important when you're building a
7 coworker model because if you're bringing in
8 the more highly exposed workers more often
9 then you're kind of biased already towards the
10 higher exposures.

11 So, I guess we can start with the
12 temporal analysis which I think the best table
13 to look at is Table 3. Let's see, it's on
14 page 21 but I'm looking at the non-PA-cleared
15 version. But it should be Table 3. And this
16 kind of gives the number of samples by year.

17 And as you can see, like the
18 minimum was in 1988 when there were 180
19 measurements taken. But I mean it's
20 consistently above 100 and could get as high
21 as four or five hundred there in the '86 to
22 '87 period. So --

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1 CHAIRMAN CLAWSON: Hello?

2 MR. KATZ: Bob? I think we've
3 lost you.

4 MR. STIVER: Bob, we lose you
5 there.

6 MR. KATZ: He doesn't know that
7 he's been lost. Does someone have another
8 cell number they can reach him to let him know
9 he's not talking to us?

10 MR. STIVER: Let me try.

11 MR. BARTON: I'm sorry, hello?
12 Can anyone hear me?

13 MR. KATZ: Yes, you're back.
14 Okay. Whatever you said in the last minute or
15 so, we haven't heard it.

16 MR. BARTON: Oh, really. Okay.
17 Where did I leave off?

18 MR. KATZ: You were just going
19 into Table 3.

20 MR. BARTON: Okay, Table 3. So
21 this kind of demonstrates the temporal
22 analysis that we did. And you can see in that

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1 second column we have the number of samples or
2 measurements taken by year. And as you can
3 see from `79 to `88 the lowest was in 1988
4 with still over 100 samples. And it could
5 range up to four or five hundred samples. So
6 we really didn't see any situation where there
7 was a large temporal gap which would obviously
8 beg the question what was going on at the site
9 then. And in that case you'd sometimes look
10 to see if you could use surrogate data from
11 surrounding years. But in this case we really
12 didn't have any issues from a temporal
13 consideration standpoint.

14 So, I mean if we keep scrolling
15 down we did some magnitude analysis which I'm
16 not sure really ties in from an SEC discussion
17 here. But it was certainly informative if you
18 kind of look at the exposure potential by
19 year. As we can see sort of in the early
20 years, I'm looking at Table 4 now which has
21 the actinium results.

22 In the earlier years, `79, `80,

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1 '81 you generally had a higher -- the 95th
2 percentile is actually above the minimum
3 detectable activity. And of course 1979 you
4 still had operations going on so that's not
5 surprising. And we also had some indication
6 that there may have been operations in 1980
7 and maybe a few after that. So that might
8 explain why you see a little bit higher
9 results in the earlier years.

10 Also, it could be a result of the
11 previous operational period where you had
12 workers who were exposed there and they're
13 still showing a lung burden from a longer
14 solubility type.

15 So, the next test that we did
16 which is shown in Table 7 is we said okay, we
17 don't have any real problems from a temporal
18 standpoint. Let's take a look at the job
19 titles and let's see who was monitored, how
20 many samples for each worker do we have and
21 what is the relative magnitude of those
22 results. Because obviously as I said before

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1 if your monitoring program was focused on job
2 types that really didn't have any exposure
3 potential such as the office workers, well,
4 there might be a problem here.

5 And when we looked at it we really
6 found just the opposite where 55 percent of
7 the samples that we have were for chemical
8 operators which is obviously a very
9 encouraging sign. They're generally
10 considered the highest exposed worker type.

11 And if we look at that chemical
12 operator group they also have the highest
13 actinium and lead results compared to the
14 other job types. So not only were you
15 monitoring the highest exposed worker type
16 that are included in there. They're also kind
17 of biased towards that higher exposure
18 potential which is obviously very encouraging,
19 you know, from a coworker discussion.

20 Am I still on the line? I feel
21 like I have to check every now and then.

22 MR. KATZ: You're still there,

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1 you're still there. Thanks.

2 MR. BARTON: Okay, good. Okay.
3 So there are a couple of other -- the cells
4 that are highlighted here are instances where
5 that 95th percentile was above the minimum
6 detectable activity. You know, there's a
7 couple of maybe you'd call them aberrations.
8 Like the health and safety group had some high
9 lead results. And you know, maybe not as many
10 samples. But that could also be a function of
11 the fact that there weren't as many health and
12 safety as there were some of these other job
13 titles.

14 But I think the takeaway from that
15 is as we looked at it you're focusing on the
16 highest exposed job category which obviously
17 is very encouraging to be able to build a
18 coworker model that can effectively bound
19 doses to these workers. So that's sort of
20 what we looked at from a job standpoint which
21 was kind of the second facet.

22 The third one as I said before was

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1 let's take a look by plant area. And this is
2 shown by plant area in Table 8.

3 And this kind of unfortunately did
4 not give us a whole lot to go on. As you can
5 see the number of samples, the highest
6 proportion of samples was associated with
7 other areas. And this doesn't mean we don't
8 know what areas they were, it's just they
9 didn't fit into these categories of specific
10 plant numbers.

11 As I discussed before a lot of the
12 exposure potential would likely have been re-
13 drumming activities and stewardship activities
14 which a lot of the stuff was stored outside of
15 buildings. And so you may not see that when
16 looking at the in vivo records that they would
17 have focused on the pallet outside of Plant A
18 where they were doing repackaging of drums or
19 something like that.

20 So while we don't really see a
21 trend either way I think this kind of just
22 shows us that we're not focused on maybe any

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1 one plant. But then again when we're talking
2 about thorium activities these workers are
3 kind of pulled from different plants as
4 needed.

5 So based on interviews and based
6 on this fact we really didn't expect to find
7 anything. But you know, we took a look at it
8 anyway. You know, I don't think there's
9 anything here that would indicate that this
10 coworker model can't be used to bound doses in
11 an SEC context.

12 And I think when you take this
13 particular test along with the other tests
14 such as the fact that they sampled the
15 chemical operators more often and what we're
16 going to get into next which is the frequency
17 of sampling among positive workers, I think
18 when you take the whole body of evidence I
19 think it really bodes well for the usability
20 of this data set from a completeness
21 standpoint.

22 So that's kind of the third thing,

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1 we looked at it by plant. Couldn't really see
2 anything but then didn't really expect to find
3 anything earth-shattering there anyway.

4 So the last thing we looked at was
5 the frequency. So we looked at those workers
6 who did have positive results and said all
7 right, how much time between that positive
8 result and the next time they were measured.
9 You know, how does that compare with the rest
10 of the monitored worker population? Were they
11 sampled much quicker than the standard worker
12 who had results below the MDA? Or were they
13 the same? Or were they kind of ignored? So,
14 I mean that's an important question.

15 And the results from that study
16 are in Table 9. And what we see here is the
17 number of days between a positive sample and
18 the next sample you see. And there's three
19 groups shown. There's everybody and then
20 there's the group that had a positive sample.

21 And then you had sort of the group that
22 didn't have a positive sample. So the first

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1 one you have everybody and then you kind of
2 parse it into those who have positive and
3 those who didn't.

4 And I think what this -- this is
5 kind of very telling is we see, I mean just
6 looking at the arithmetic average if you had a
7 positive sample on average you were sampled
8 again within 3 months, 106 days. Whereas if
9 you didn't have a positive sample you know
10 it's over a year, you know, 480 days.

11 And if you go to the other
12 methods, the geometric mean and the rank-
13 ordered median it becomes even more pronounced
14 where if you had a positive sample you were
15 sampled again 10 times faster than those
16 workers who had a measurement and they didn't
17 have a positive result.

18 So again that's a very important
19 piece of evidence because it pretty much
20 indicates that if they saw that you had a
21 positive result which would be indicative of
22 exposure potential they're like all right,

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1 we've got to count you again. So they're
2 actually focusing on the group that they were
3 measuring that had higher results. So I
4 thought that that was another piece of
5 evidence that was just a very encouraging
6 sign.

7 So, to kind of summarize here, you
8 don't see any issues from a temporal
9 standpoint because we have a fair number of
10 data points in each year that we looked at. I
11 guess one important point here is this is from
12 1979 to 1989 but we only had data up to 1988.

13 And so a surrogate approach is going to have
14 to be used to kind of bound 1989. That's why
15 there's kind of a discrepancy there.

16 When we looked at the job title
17 the most -- over half the samples were for
18 chemical operators which when you look at the
19 magnitude of the results they also had the
20 highest samples among the different job types
21 so that's very encouraging. They were looking
22 at the highly exposed job classification.

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1 We looked at the plant and can't
2 really pull a good conclusion there which we
3 kind of expected. As I said at Fernald for
4 thorium work they would kind of pull you from
5 a plant as needed. So it wasn't like there
6 was a specific plant where they would always
7 pull thorium workers from. I mean it was
8 really an as-needed basis.

9 And again, a lot of the exposure
10 potential would likely be associated with
11 stewardship activities which could be anywhere
12 that thorium was stored and a lot of times
13 that was outside so maybe they wouldn't assign
14 you necessarily a specific plant number if
15 that's kind of the work you were doing. And
16 so that's a plant kind of analysis.

17 And then finally what's the focus
18 as far as if you had a positive sample? How
19 quickly did they bring you again. Looking at
20 that, how they range anywhere from a factor of
21 4 to a factor of 10 times faster if you had a
22 positive result.

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1 So I think taking all those things
2 together it's SC&A's belief that we don't see
3 any reason who you can't use this data set.
4 And that the main caution I guess we would say
5 is that since you can't identify which of
6 these workers in the data set or otherwise
7 worked with thorium that when you apply this
8 coworker model even though it's biased towards
9 those with higher results, biased towards
10 higher job titles, you just want to kind of
11 assure that when you assign an unmonitored
12 dose and you don't know if they worked with
13 thorium that you're going to bound the
14 potential for that worker to have been exposed
15 to thorium.

16 So I guess that's where we come
17 out on completeness. Does anyone have any
18 questions before we kind of move onto
19 adequacy? Am I still on the line?

20 CHAIRMAN CLAWSON: Yes, this is
21 Brad. I don't have any questions at this
22 time.

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1 MS. BALDRIDGE: This is Sandra. I
2 do. Can you tell from the data results
3 whether there is a significant transition in
4 what one year reveals as compared to the
5 other? Since this time frame prior to 1985
6 was when National Lead of Ohio was under
7 investigation for corrupted data and
8 ultimately transitioned to Westinghouse
9 somewhere `85 or beyond.

10 MR. BARTON: Okay, I certainly
11 understand the question. In this report I'm
12 not sure if, Sandra, you have a copy of this
13 to be able to look at. It is PA cleared so
14 I'm sure we can get you a copy. But in Tables
15 4 and 5 we did look at the magnitude of the
16 results by year at the 95th percentile. We
17 found that the highest results we observed
18 were in the 1979 to 1981 period in general.

19 And that I'm kind of looking at
20 the data and I don't see a specific sort of
21 transition from when they went from NLO too
22 Westinghouse. I can say during those years of

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1 transition around 1985-1986 they had a spike
2 in the number of measurements that were taken
3 but not necessarily -- I mean we haven't done
4 a statistical analysis to see if there's a
5 significant difference in magnitude.

6 But just looking at the results I
7 don't -- it doesn't appear that they went from
8 extremely low values to an extremely high
9 value as if there was any falsification going
10 on. But again, we haven't done a rigorous
11 statistical analysis looking at that specific
12 transitional period.

13 MR. STIVER: Yes, Bob. Something
14 else that I noticed is that 98 percent of the
15 data, or 95 to 98 are below the MDA.

16 MR. BARTON: Right.

17 MR. STIVER: And the only time you
18 really see many results above the MDA -- that
19 earlier period when they're transitioning over
20 from production to stewardship. So it appears
21 that -- first of all, you wouldn't be able to
22 determine from this data set that there was

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1 any kind of a difference going from the NLO to
2 Westinghouse. Mainly more -- you're seeing
3 some kind of residual effect from carryover
4 for production. That's how I would interpret
5 that.

6 MR. BARTON: I think Ms. Baldrige
7 was maybe asking if there was a significant
8 jump.

9 MR. STIVER: Yes, but there's
10 really no way you could tell. Almost all that
11 data is less than the detection limit at that
12 point.

13 MR. BARTON: Right, right. I'm
14 sorry, Ms. Baldrige, does that sort of answer
15 your question?

16 MS. BALDRIDGE: That's fine, thank
17 you.

18 MR. STIVER: Is there any other
19 questions on completeness?

20 MEMBER ZIEMER: This is Ziemer.
21 I'm back on the line. I don't have any
22 further questions on it.

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1 MR. BARTON: I guess did DCAS or
2 ORAU have any initial comments they would like
3 to make? Or we can just wait for their
4 official response on this topic? Is there
5 anything else out there?

6 MR. HINNEFELD: I don't know what
7 to say other than thank you. But I don't know
8 of anything responsive.

9 MR. BARTON: Okay. Well I guess
10 if there's nothing more on completeness,
11 Joyce, are you on the line to kind of talk
12 about your work on the adequacy standpoint?

13 DR. LIPSZTEIN: Okay. When I
14 looked at the data the data is -- it's okay.
15 We have data on lead and we have data on
16 actinium. And my problem is not an SEC
17 problem, it's more like something that will
18 come after how I -- is NIOSH going to
19 interpret the data.

20 The problem is that NIOSH has
21 proposed to use lead-212 results and discard
22 the actinium-228 results. The problem is that

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1 we have much more actinium-228 results that
2 are higher than the MDA than lead-212. And
3 actinium-228 doesn't have any influence of
4 radon on the measurements.

5 So, and when you measure actinium-
6 228 and you are able really to measure
7 actinium-228 in a worker it means that really
8 there was exposures to thorium-232. So, I
9 would just ask NIOSH to review.

10 It's not, again, it's not an SEC
11 problem now, it's more like a TBD problem.
12 But I think SC&A would like to ask NIOSH to
13 review how they are going to interpret the
14 results from measuring actinium-228 and lead-
15 212, interpret in terms of thorium exposure.

16 MR. HINNEFELD: Okay. Karin, is
17 there someone on your team who's ready to
18 speak to that?

19 MS. JESSEN: Tom LaBone.

20 MR. LABONE: Was the question how
21 we were going to model this data?

22 MR. HINNEFELD: The question was

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1 how will we -- for dose reconstruction how
2 will we interpret an in vivo result where the
3 lead-212 result is below the detection level
4 but the actinium-228 is detectable.

5 MR. LABONE: All the work that we
6 have been doing modeling this is based upon
7 the lead-212. To my knowledge we haven't
8 looked at folding both of those, the actinium
9 and the lead into the evaluation. So we have
10 not looked at that.

11 DR. LIPSZTEIN: So that's what we
12 would like you to do. Because if you built a
13 coworker model based on the lead-212 you are
14 going to have much different results than if
15 you looked at the actinium-228 and made
16 claimant-favorable assumptions about actinium-
17 228.

18 MR. HINNEFELD: Okay. This is Stu
19 and I did recognize that from your report.
20 And we are working with the contractor to get
21 to that. I had a conversation with Matt McFee
22 about it yesterday. So that, we know that

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1 that is a question we need an answer to.

2 MR. STIVER: Stu, this is John.
3 Do you have any idea, like a time frame for
4 that?

5 MR. HINNEFELD: I don't. This is
6 wrapped up into also how do we -- what
7 separation history are we going to assume for
8 these dose assessments. Because remember the
9 separation history for thorium is going to say
10 how much, you know, what's the difference
11 between the lead-212 that's there and the
12 thorium-232 that's there.

13 So in combination with that it
14 would seem to me that there's an answer here
15 that falls out of that approach, that with a
16 particular interpretation of separation
17 history that there should be a way to deal
18 with this. Either that -- and I really hate
19 to speculate any further here because I
20 haven't -- we haven't gone through it. But
21 it's tied to that.

22 You know, clearly we don't have an

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1 expectation that the chain is going to be in
2 equilibrium. There's going to be some sort of
3 disequilibrium depending upon its separation
4 history. The separation history in all
5 likelihood is going to be unknown. In fact, I
6 can almost -- with certainty the in vivo
7 results of separation history of material that
8 was taken is going to be unknown.

9 And so we have to make some
10 appropriate assumptions about the separation
11 history and therefore those various ratios in
12 order to do a bounding dose assessment. And
13 it could be that -- and so this question of
14 how you deal with actinium that is detectable
15 and lead that is not is also related to that,
16 that various ratio question. So I think it's
17 going to come out of that.

18 I don't have a time frame, but I
19 don't really envision it taking a whole lot of
20 time I hope.

21 MR. STIVER: I was kind of under
22 the impression that NIOSH was going to go with

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1 a bounding triple separation assumption.

2 MR. HINNEFELD: Yes, I think
3 that's where we are is that we're expecting
4 that. And so that puts your lead-212 at
5 somewhere just like 20 percent of the thorium.

6 MR. STIVER: Yes, I think it's
7 like 19 percent or something.

8 MR. HINNEFELD: And there's some
9 other value of actinium-228 that goes in
10 there. And so it's an evaluation of that and
11 what adjustments, if any, are needed.

12 It would seem to me, I'm pretty
13 sure the actinium at that point is somewhere
14 between the lead and the thorium-232.

15 And it may come down to a
16 magnitude of difference between actinium and
17 lead-212. And if it's less than sub-magnitude
18 you do nothing because it fits with your
19 assumption separation.

20 So I don't know. I think it's
21 going to come down to an analysis of those.

22 MR. LABONE: This is Tom. Can I

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1 make another clarification? I interpreted
2 Joyce's question to mean when we're going to
3 evaluate the lead-212 I think it has a lot of
4 advantages versus the actinium.

5 The question was what are you
6 going to do when basically you're getting some
7 positive hits for actinium but with no lead.
8 And so what I would respond is that we have
9 not to my knowledge, I mean we know how to
10 handle lead. We proposed that -- the
11 methodology. But we haven't built into that
12 to check to see does the actinium make sense.
13 So that's what I was answering.

14 Everything Stu said was right,
15 it's just I think I interpreted the question
16 differently. When you have this disagreement
17 are you going to check for it and what are you
18 going to do about it. That's the thing we
19 haven't done yet.

20 MR. STIVER: Tom, this is John. I
21 had stepped out for a couple of minutes, and I
22 had missed that little part of the discussion.

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1 Thanks for clarifying.

2 MR. LABONE: Want me to repeat it?

3 MR. STIVER: No, thank you for
4 clarifying that point.

5 MR. LABONE: Okay.

6 DR. LIPSZTEIN: Because when you
7 have actinium counts, if you can really see
8 actinium then it means the person was exposed
9 to thorium. And actinium doesn't, you know,
10 it's not affected by the number of separations
11 that you do. So if you are going to use the
12 actinium data then the bounding assumption has
13 to be different than the bounding assumptions
14 for lead-212.

15 MR. LABONE: If you see actinium -
16 -

17 DR. LIPSZTEIN: And between the
18 thorium and the lead you have radon in the
19 middle. So --

20 MR. LABONE: If you see actinium
21 all you really know is that they were exposed
22 to radium.

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1 DR. LIPSZTEIN: Yes.

2 MR. LABONE: Yes, okay. And
3 whereas if you see the lead then you know they
4 were exposed to thorium-228.

5 DR. LIPSZTEIN: Yes, but some of
6 it could be only radon.

7 MR. LABONE: Yes. That's why I
8 think that the lead is a more reliable
9 indicator of the actual thorium there as
10 opposed to were they just exposed to radium-
11 228 which is --

12 DR. LIPSZTEIN: I don't know. I
13 don't know if there was the separation and you
14 just had thorium then actinium can be linked
15 to thorium. When we measure people that are
16 exposed to thorium we measure actinium. So,
17 and in general it's very difficult to get
18 positive counts for actinium if you have -- if
19 you possibly have an exposure.

20 But you know, it's not an SEC
21 problem now. But I think it's a problem for
22 interpretation of results, what to do with

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1 these results.

2 MR. HINNEFELD: This is Stu. I
3 think that might be all we can say about this
4 at this point, right?

5 DR. LIPSZTEIN: Yes.

6 MR. HINNEFELD: I don't know if
7 you have other points to make on your in vivo
8 report.

9 DR. LIPSZTEIN: No, that's it.

10 CHAIRMAN CLAWSON: So, John, this
11 will be -- that part of it will be marked as a
12 TBD issue.

13 MR. STIVER: Yes. It's just a
14 matter of kind of DCAS coming back with an
15 explanation or response and their best
16 estimate as to why they're seeing what they're
17 seeing.

18 CHAIRMAN CLAWSON: The one
19 question I had was using this information, you
20 know, that said that they'll be able to do it.

21 I guess the one question I had was kind of
22 like, well, so who are they going to use this

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1 on. Are they going to use this as site-wide
2 or because I don't think they can really
3 separate even though there is good chemical
4 operator. My question is how are they going
5 to implement this to the site. Is it going to
6 be the whole site or how are they going to do
7 this dose reconstruction.

8 MR. HINNEFELD: I'm not sure if we
9 specified that yet. Certainly if we haven't
10 yet we will.

11 CHAIRMAN CLAWSON: Well, and this
12 is the one question that I had on it is how
13 are we going to implement this. So I guess
14 this would be a question for you guys, if
15 you're going to try to separate it out to
16 people which I think personally that you'd
17 have a problem with. Or is this going to go
18 site-wide?

19 MR. STIVER: Brad, maybe I can
20 step in. This is John Stiver. The original
21 thorium model, they had planned to assign I
22 believe the geometric mean to those with data.

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1 I think the problem that we have
2 identified in all these thorium discussions is
3 that you just, as Bob has pointed out, we
4 really are -- because you don't have the
5 granularity in the data to determine who was
6 working with thorium at a given plant in a
7 given year. It becomes, it kind of devolves
8 to a situation where you really need to have
9 kind of a bounding one size fits all model
10 that in my mind would apply to everybody
11 during that period, everybody in the plant.

12 CHAIRMAN CLAWSON: Yes, and I
13 understand that, John. I just wanted to make
14 sure that with NIOSH and ORAU that that is how
15 we were looking at it is that it was going to
16 be for the whole plant or not. I guess that's
17 what I wanted to make sure of.

18 DR. LIPSZTEIN: May I? Excuse me.
19 I was thinking of what Tom said is right.
20 There is a problem. If they find out that the
21 actinium measurement is not, you know, is not
22 matching the lead-212 and there is no

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1 explanation then and we don't know if we can
2 trust this data. So I think that Tom's
3 interpretation is very great.

4 In order to determine if this is
5 an SEC issue or not you have to see if the
6 actinium-228 measurement results make sense
7 with the lead-212.

8 MR. STIVER: Yes, I think you've
9 got two issues, the possibility of a radium-
10 228 exposure and the absence of thorium-232.
11 And then also the idea of translocation due to
12 the radon migration out of the lungs. It
13 could result in a lower lead-212 in
14 comparison.

15 DR. LIPSZTEIN: Yes. So that's
16 what Tom said he was going to look at, right?

17 MR. HINNEFELD: Well, this is Stu.
18 I'm not aware of any potential for a radium-
19 228 exposure at Fernald.

20 MR. STIVER: In the absence of
21 thorium.

22 MR. HINNEFELD: In the absence of

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1 thorium, right.

2 MR. STIVER: The only thing that
3 came to my mind would be some raffinate
4 workers that might have had exposure without
5 the thorium. That would seem kind of
6 farfetched in comparison to the translocation
7 model. But anyway, I guess that's in your
8 court then to work on that particular issue.

9 CHAIRMAN CLAWSON: So help me
10 clarify what Joyce just said. Is this still
11 an SEC issue?

12 MR. STIVER: I would say that it's
13 predominantly Site Profile. There is this
14 idea that how do you explain the actinium in
15 the absence of lead. And I guess that's what
16 NIOSH is looking into at this point.

17 CHAIRMAN CLAWSON: Okay. And so
18 that'll just be an action item for them of how
19 they're --

20 MR. STIVER: Right.

21 CHAIRMAN CLAWSON: -- they're
22 going to do that. How it's interpreted.

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1 But also on the other hand too
2 part of it is how they're going to disperse
3 this as far as who will be using this.

4 MR. STIVER: Sorry to interrupt
5 you.

6 CHAIRMAN CLAWSON: No, just my
7 question of so how are they -- who's going to
8 receive this? How are they going to disperse
9 it. That was one question that I brought up
10 earlier and I believe Stu was going to get
11 back with this of how we were going to
12 implement this data.

13 MR. HINNEFELD: Yes.

14 CHAIRMAN CLAWSON: And who it was
15 going to go to.

16 MR. HINNEFELD: Yes.

17 MR. STIVER: Any more comments or
18 questions on in vivo thorium? Am I still on?

19 MR. KATZ: It sounds like you can
20 go on, John, to Issue 6a.

21 MR. STIVER: All right, Issue 6a.
22 This relates to the coworker model for

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1 thorium for the period 1953 to 1967 using
2 daily weighted exposure alpha air
3 concentration data.

4 This is an issue that has been
5 active for about 5 years. In fact, when I
6 first came to SC&A this was my first
7 assignment was to respond to NIOSH's 2009
8 paper, their coworker model which was Revision
9 2 where they developed a construct for DWE to
10 be used in kind of a general sense for any
11 kind of alpha-emitting airborne concentration
12 in the absence of urine bioassay monitoring
13 data.

14 So what we'd like to do since this
15 has been such a long process to get to where
16 we are today I'd kind of like to just set the
17 stage just briefly without going into too much
18 detail of how we got here and what the big
19 issues were.

20 Now, if you'll recall back in July
21 of 2009 SC&A produced a White Paper response
22 to I believe a -- document Morris 2009 which

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1 is Revision 2 of the coworker model.

2 And in that particular White Paper
3 we identified about 20 different findings.
4 And those were discussed in detail at the
5 January 2010 meeting. And probably not until
6 November of 2010 that NIOSH put forth Revision
7 3.

8 Now, Revision 2, basically those
9 20 findings are distilled down to two big
10 issues. And these were first the construct
11 that NIOSH had developed to assess a bounding
12 dose in Revision 2 was to take DWEs for a
13 given plant in a given year, fit them to a
14 probability plot, do a log normal fit and then
15 pick off different proportions of that
16 distribution as if you were looking at urine
17 bioassay data or unweighted air sampling data,
18 and then assign whatever you thought. The
19 95th percentiles were the most highly exposed
20 workers and so forth.

21 And the problem you had with that
22 was it seemed to be a conflation of unweighted

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1 air sampling data and DWEs. You've got to
2 remember what a DWE really is. A daily
3 weighted exposure is a weighted average
4 concentration experienced by a worker in a job
5 category on the day that that sample is taken.

6 The point being it's an average value for a
7 category of workers. It doesn't represent an
8 upper -- you can't plot all these on a line
9 and then pick off a 95th percentile. Anybody
10 who's above that 95th percentile, that
11 assignment is no longer or is not a bounding
12 dose. In fact, way low because each of those
13 values represents an average for a particular
14 category.

15 Combined with that there was no
16 estimate of uncertainty applied in the HASL
17 reports which drive these data. So you have
18 these two big issues. You've got the approach
19 or the basic construct, the basic concept was
20 flawed. And then on top of that there was the
21 issue of uncertainty and granularity in the
22 data.

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1 Now, back in 2010, in November of
2 2010 in relation to the Weldon Springs
3 activities that were going on, it was kind of
4 similar with the DWE problem. NIOSH indicated
5 that well, we've got a new approach. There's
6 this report by Davis and Strom of PNNL in 2008
7 that really looked at this notion of how are
8 we going to address uncertainty in DWEs.

9 And what they did was they took
10 DWE data from about six facilities, processed
11 uranium, thorium and also looked at radon in
12 the late forties and early fifties. And they
13 did a couple of different approaches where
14 they went through and did Monte Carlo sampling
15 of all the different air concentrations for
16 each task and propagating to drive an
17 uncertainty distribution.

18 And at the end of the day they
19 determined that a GSD of 5 was probably
20 adequate for most situations. I believe they
21 ranged, the GSDs ranged from about on average
22 I think about 4 to about 7 to 8. And so they

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1 recommended this GSD of 5.

2 And also in a situation where you
3 didn't know where a worker was, you didn't
4 have that type of worker placement data that
5 assigning the 95th percent DWE or the highest
6 DWE in a particular facility for that year
7 with this uncertainty estimate would be
8 adequately bounding. And that's in essence
9 what NIOSH did in Revision 3.

10 We looked at that. We thought
11 well, we think that conceptually this is
12 acceptable from a scientific standpoint.

13 What we were not 100 percent sure
14 on was how well this could be implemented.
15 Did NIOSH indeed have the data that would
16 allow them to place workers in a particular
17 plant in a particular year so that they could
18 go in and say, okay, this guy was in Plant 9
19 in 1955. We're going to give him the highest
20 DWE which is 685 MAP for that particular year
21 in the plant.

22 And so Bob Barton set out to take

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1 a look at this idea like we did with the in
2 vivo data. Let's look at data completeness.

3 And he did a very thorough job as
4 he always does. And produced a report that we
5 delivered back in October which is entitled
6 "Feasibility of Identifying Workers in
7 Specific Plants and Areas of Fernald for
8 Identification with Thorium Operations in
9 1953-1967." And I believe you've all seen
10 that report.

11 And so before Bob gets into that I
12 would just like to say the two biggest
13 important aspects of this. In terms of the
14 latest model which is Revision 4 that NIOSH
15 just delivered to us last Friday is that it
16 appears that they have gone and abandoned the
17 Revision 3 approach which we thought was
18 scientifically acceptable using the highest
19 DWE for the facility, giving it to everybody,
20 a one size fits all model where you know not
21 everybody was in that most highly exposed
22 group but you have data that indicate that

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1 some workers were with the GSD of 5. So those
2 two issues.

3 They appear to have gone back to
4 the Revision 2 approach where what they did,
5 they determined because Bob found that there
6 was -- I'm going to steal a lot of your
7 thunder here, Bob -- found that there wasn't
8 enough worker placement data to really
9 implement it as they had by plant and year.

10 NIOSH went back. They picked out
11 all the DWEs per year. But they used the old
12 Revision 2 approach that fit into a log normal
13 in taking percentages off as though they were
14 working with air sampling data and not DWE.
15 So they kind of brought us full circle back
16 around.

17 But Bob, if you can kind of give a
18 little more detail on what you found with the
19 feasibility study.

20 MR. BARTON: Sure, John. As John
21 said we kind of looked at how feasible is it
22 to implement this type of approach. Were you

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1 able to identify claimant-specific plants by
2 year? Because that's kind of the criteria you
3 need to implement what was proposed in
4 Revision 3.

5 So what we did is we took two
6 different approaches. First, we did a
7 claimant sampling. We then go into claimant
8 files because this is obviously who you'd be
9 applying this model to and we selected 20
10 semi-randomly selected claimants.

11 When I say semi-randomly basically
12 what I mean is, one, we wanted to get
13 claimants that actually were working in the
14 period of interest. We wanted to get
15 claimants who had maybe the higher-risk job
16 titles because again those are the workers
17 you're really worried about.

18 And the third thing was there was
19 a memo in 1967 by [identifying information
20 redacted] which identified by name and by
21 badge number thorium workers. So I kind of
22 biased it towards that. I wanted to pull a

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1 few of those workers, look in their claim
2 files and see well, can we tell where these
3 workers were as they were at the plant. What
4 plant were they and what year as you would
5 kind of need to implement the Rev 3 approach.

6 And looking through these claimant
7 files there's a number of different sources
8 that do give some information on work
9 location. And in this report we're looking at
10 they're listed on page, let's see, what are we
11 on here. Bottom of page 7, Section 4.1. And
12 there's kind of a list of bullets there.

13 You see that some uranium
14 urinalysis reports would give the plant
15 number. If there was a film badge
16 investigation that would often give the work
17 location similar to radiation exposure
18 investigation which is kind of similar to the
19 film badge investigations. It's a different
20 form but it still will provide information on
21 work location.

22 You had personal clothing and

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1 monitoring reports, health and safety
2 information reports. And then sometimes they
3 would note work location on a periodic
4 physical exam.

5 And then all of those first six
6 sources, they all come from the DOE files used
7 that have all the bioassay data and monitoring
8 data.

9 We also did look through the
10 Department of Labor files. They were far less
11 informative and generally if there was any
12 information it would just be mirrored in what
13 was already in the DOE files.

14 The last source there is the
15 computer-assisted telephone interview,
16 otherwise known as the CATI report. And
17 employment records. And there's a reason that
18 I put employment records on the same line as
19 the computer-assisted telephone interview. We
20 only saw 1 of the 20 claimants who had a full
21 employment record. And by that I mean we
22 actually could tell where he was pretty much

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1 with a good degree of accuracy throughout his
2 employment.

3 The reason I put that with the
4 CATI report is that information was supplied
5 by the claimant. They actually had their
6 employment records on hand and they supplied
7 that information to NIOSH as part of their
8 claim. I did not see any examples of that in
9 just files gotten from DOL or DOE. So I kind
10 of wanted to make that delineation. I don't
11 know how feasible it is to get that type of
12 employment record for all of the workers but
13 that is certainly not available at this time
14 for 19 of the 20 claimants we looked at.

15 So I think the real sort of meat
16 and potatoes here is if you scroll down to
17 Table 1. And this kind of describes the list
18 of 20 claimants that we looked at. And for
19 example, the very first one, the job title is
20 redacted but they were employed from 1953 to
21 1963. And the only source of information we
22 had on location was some of the urinalysis

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1 results. And it was only four of the samples
2 which was roughly 17 percent and only for the
3 years 1956 to 1957. So there's a large
4 portion of that worker's employment that you
5 just don't know where they were working.

6 And in that case the CATI report
7 and the claim application which is part of the
8 Department of Labor files, they specify an
9 area but don't give a date of when they worked
10 in that area. And as we know at Fernald they
11 could move around quite a bit.

12 I think something else to remember
13 when you're looking at information supplied by
14 the CATI report, oftentimes they don't give
15 specific dates on what plant they worked in
16 and when. Oftentimes the CATI report is not
17 available. And oftentimes the CATI report is
18 conducted by the survivor who may not have
19 specific information on where the claimant had
20 worked. So there's always that caveat when
21 you look at CATI interviews for the
22 information.

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1 The prime source you'd really want
2 to have for implementing such a model would be
3 in the information supplied by DOE and DOL.

4 So as you kind of go through this
5 table you can kind of see that many of these
6 workers just don't have a lot of location-
7 specific information in their files. You
8 might have a few samples. I mean if we look
9 at the second one you had six film badge
10 investigations.

11 It's important to note that those
12 only cover a week of exposure. So those six
13 reports, we may know where they were that week
14 but the rest of the year we really don't know.

15 They had, again, 17 samples of urinalysis but
16 they had about 100 that didn't have any
17 location specified. So again there's really a
18 paucity of information out there to try to
19 piece to where these workers were located.
20 And that's really the main conclusion from the
21 claimant sampling we did.

22 But we didn't stop there. We kind

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1 of wanted to take also a more macroscopic
2 view. As you look at Table 1 you see a lot of
3 the information we were able to find about
4 work location was in the urinalysis results.

5 So what we did is we then said
6 okay, let's look plant-wide. Let's look into
7 the HIS-20 database. Let's pull out all the
8 urinalysis results and let's see how many
9 actually specify the work location.

10 And when we did that and that
11 review was done in Section 4.2 and is kind of
12 represented in Table 2 which is on page 14.
13 We see that really the urinalysis results only
14 really report location for 1955 through 1957
15 and sparingly before and one year after that.

16 And you know, there were a few in 1961 but
17 all the other years urinalysis results don't
18 actually report the work location.

19 I mean 1955 to 1957 you have
20 roughly 60 to 70 percent of the urinalysis
21 results do report a work location but the rest
22 of the years you really don't have anything.

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1 So I guess to kind of wrap this up
2 we looked at the 20 claimants and the
3 information regarding where they worked was
4 pretty sparse. And even when we looked at
5 sort of the macroscopic big picture view, the
6 HIS-20 database, again we came up with a
7 similar conclusion that maybe aside from these
8 years `55 to `57 there's just not really data
9 out there to characterize and place workers
10 into specific plants as you would sort of need
11 to implement the Revision 3 strategy as it was
12 outlined.

13 So I guess that's where we stand
14 from the feasibility for Rev 3 and that sort
15 of predicated Rev 4. Does anyone have any
16 questions on this particular study? Am I
17 still on the line?

18 MR. HINNEFELD: You're still on,
19 Bob.

20 CHAIRMAN CLAWSON: We're listening
21 to you.

22 MR. BARTON: Okay. Well I mean

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1 that's pretty much. Just to wrap it up we did
2 two separate approaches. One was a claimant
3 sampling where we did try to focus on those
4 workers who were employed during the period of
5 interest who had likely high exposure
6 potential.

7 And also took it the next step and
8 said well, we have a list of people we know
9 worked with thorium at least around in the
10 late sixties as the memo came out in 1967.
11 Let's look at those workers specifically
12 because they did work with thorium. And again
13 we just couldn't place them, where they might
14 have worked with it and when.

15 MR. STIVER: Thanks a lot, Bob.
16 If there's no other questions I just wanted to
17 make a couple of more statements before I ask
18 Stu to talk a little bit more about Rev 4.

19 But as I said we've got some
20 pretty serious concerns about reverting back
21 to the Rev 2 conceptual approach. And I
22 believe if that is indeed the approach that

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1 you're going to be taking, that NIOSH is going
2 to take that we have some real problems with
3 it. It basically sets us back about 3 and a
4 half years in terms of where we were in this
5 particular issue that we thought was resolved
6 as of November 2010 for all intents and
7 purposes.

8 MR. HINNEFELD: Yes, this is Stu.

9 I'm confused by that. You say that -- help
10 me out with what's the Rev 2 approach. The
11 Rev 3 approach versus.

12 MR. STIVER: Rev 3 was basically a
13 one size fits all model with a level of
14 granularity that would allow a researcher to
15 identify a worker by building and by year.
16 And once that was established then the highest
17 DWE for that year and building combination
18 would then be applied to everybody. Basically
19 it's going to apply it to everybody in that
20 particular year and building. So anybody who
21 fell into that category would get that DWE.

22 Because Bob was able to

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1 demonstrate that he didn't have that level of
2 granularity in the data, that you couldn't
3 identify somebody by a particular plant in a
4 given year because people were moving among
5 the plants as they were needed.

6 And so what the Rev 4 model does
7 is it takes all the DWEs for a given year
8 across all plants and then does this log
9 normal fit, then picks off percentiles of the
10 log normal distribution to assign DWE
11 exposures for various categories of workers.
12 Essentially what Revision 2 did.

13 And we don't believe that that is
14 a scientifically defensible approach because
15 the DWEs actually represent average exposures
16 as measured on that day for those workers who
17 were actually involved in the study. But
18 they're averages for a particular category of
19 worker. And so there's a whole range of
20 uncertainty associated with each of those
21 DWEs.

22 So you can take the person who's

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1 got the highest DWE for a year and that is
2 just an average for that subgroup. And then
3 Davis and Strom provides the statistical
4 analysis for DWEs in general that allow an
5 uncertainty estimate to be placed on that DWE.

6 But you can't -- take a 95th
7 percentile of the plots of all the DWEs for a
8 year, you're going to have a certain number
9 who are above that 95th percentile and those
10 people are going to be way underestimated. It
11 will not be a claimant-favorable assignment.
12 You have to look at the highest DWE for a
13 given year. That's the only way that I would
14 see that that would be feasible.

15 But the approach that's outlined
16 in Revision 4 essentially goes back to the
17 Revision 2 conceptual model.

18 MR. HINNEFELD: Okay. This is
19 Stu. The change you're describing is foreign
20 to me. I don't recall seeing that. Can
21 somebody from the ORAU team help me out here?

22 MS. JESSEN: Yes. This is Karin.

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1 We would actually like to have a written
2 response to this because I'm not able to
3 respond to this today.

4 MR. HINNEFELD: Now, John what
5 you're referring to is Rev 4?

6 MR. STIVER: Revision 4 is the
7 response that Mark Rolfes sent out a week ago
8 on March 1 after our teleconference call. And
9 it's a completely different model than what we
10 had accepted in Revision 3 back in 2010.

11 MR. HINNEFELD: Is the title of
12 this document "Fernald Thorium Worker Location
13 Issue Response to SC&A White Paper, Rev 1,
14 February 21, 2013?"

15 MR. STIVER: Yes, that's it. It's
16 "Fernald Thorium Worker Location Issues."
17 Yes, that's the one right there.

18 I didn't really want to go into a
19 detailed analysis of this right now but just
20 to present some of the kind of conceptual
21 issues that kind of jumped out at me right
22 away as soon as I looked at this.

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1 MR. HINNEFELD: Is this the one
2 that has -- okay, I'm sorry I'm being dense
3 here.

4 Table 2 which has geometric mean
5 standard deviation 95th percentiles calculated
6 from log normal fit. And Table 3 which has a
7 GSD 95th percentile doing a minimum GSD of 5.

8 And then so what you're saying is
9 that the intake values were derived from level
10 2 rather than level 3?

11 MR. STIVER: Well, you might take
12 a look, just a more illustrative example of
13 what I'm talking about here. If you go down
14 to page 13 there's a log normal -- actually,
15 let's take a look at on page 14 for 1955.
16 There's a log normal fit to DWE for that year.

17 And you can see there's the DWEs
18 are represented by these blue diamonds and
19 then the log fit is the red line here. And
20 you can -- your typical construct that you
21 might use to fit air concentration data,
22 unweighted air data or urine bioassay data.

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1 What I'm telling you, if you take
2 a look at that plot there's a cluster in the
3 high end. And those are DWEs that would not
4 be -- those workers for which those DWEs apply
5 would not be given a claimant-favorable
6 bounding dose. If anything it would be
7 exceedingly low given that those DWEs, each
8 one of those blue diamonds represents an
9 average value for a particular category of
10 worker.

11 So if you look at the very highest
12 one there's probably, I don't know, it could
13 be somebody working in the metal production
14 doing the really dirty jobs. And so they have
15 essentially the highest DWE for that year
16 basically in the whole -- across all plants
17 for that year.

18 And our contention that we
19 accepted in the Revision 3 methodology was
20 that, okay, you're going to take that highest
21 value. It's a classic one size fits all
22 model. You know not everybody was involved in

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1 that work but you know that some were. And so
2 that is a plausible upper bound for that most
3 highly exposed group. And because you don't
4 have information on who was doing what at any
5 given time it has to be applied across the
6 site. It has to be applied to everybody.

7 And this particular construct
8 takes us back to Revision 2. They did the
9 exact same type of thing only instead of
10 looking at the entire complex by year they had
11 it broken down by year and plant and then
12 tried to pick off by worker type. It's the
13 exact same conceptual construct.

14 And most of the problems, all the
15 findings that we had in our initial report 3
16 and a half years ago was in relation to this
17 construct.

18 MR. HINNEFELD: Okay, I've got it
19 now.

20 MR. STIVER: Okay.

21 MR. HINNEFELD: Okay. So this
22 seems relatively understandable then that what

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1 you referred to, our Revision 3, what document
2 title is this described in? What's the
3 document title or date or something so I can
4 make sure?

5 MR. STIVER: This is -- we call it
6 Morris 2010. I can pull this up for you here.

7 Let me find it. Just a minute. I'll go back
8 in my files here. Okay, I'm having a hard
9 time pulling it up here.

10 MR. HINNEFELD: You guys call it
11 Morris 2010 and you referenced it in your
12 report.

13 MR. STIVER: Right.

14 MR. HINNEFELD: I think you did.

15 MR. STIVER: I'm trying to find
16 that exact one that I could send to you.

17 MR. HINNEFELD: Okay, I've got it.
18 It's in your report. It's a reference in
19 your report. October 2010, okay.

20 MEMBER ZIEMER: All right, this is
21 Ziemer. Is this the one referenced in the
22 second bullet on the first page of your

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1 report? "White Paper on Use of FMPC DWE
2 Reports for Estimation of Chronic Daily Intake
3 Rate Rev 3."

4 MR. HINNEFELD: That sounds like
5 it, Paul. That's how it's described in the
6 references section.

7 MR. BARTON: I think -- I don't
8 know if we're still looking for the Rev 3 to
9 get it up. I mean, we do pull one quote in
10 the location study that I just described from
11 the Morris 2010. It says, "Due to variation
12 situation job assignments it is unlikely that
13 unambiguous exposure scenarios can be defined
14 for most workers. In addition, dust emissions
15 have not been quantified except as a general
16 air sampler indicator.

17 "To ensure thorium intake
18 potential is not underestimated the DWE value
19 associated job title or job description with
20 the highest DWE value in an FMPC plant where
21 thorium was handled for a specific year should
22 be assigned to every worker in that facility.

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1 A GSD of 5 should be assumed." That is from
2 Morris 2010.

3 And I guess where we came out with
4 it is we agree with that in principle but then
5 when we really looked into it you probably
6 can't identify workers with a specific plant.

7 So you can't say well, he was in Plant 5 so
8 we'll give him the highest DWE because he
9 could have been in Plant 6 or Plant 8. That's
10 kind of I guess the only outstanding thing we
11 found with the Revision 3 methodology is that
12 we agreed that if you're going to give the
13 highest DWE value in each plant and year with
14 a GSD of 5 that sounds good to us. But then
15 if you can't identify that worker with the
16 specific plant now you kind of run into the
17 issue of how you implement that model.

18 MR. HINNEFELD: I got it.

19 MR. STIVER: Yes, so you basically
20 lose one degree of freedom. In your log you
21 no longer can identify by particular plant
22 within a year. But instead of keeping with

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1 the Rev 3 approach the new Rev 4 approach goes
2 back to the old approach of doing log fits and
3 assigning percentile.

4 MR. HINNEFELD: Okay.

5 MR. STIVER: It's a lot to absorb
6 considering that it's been 3 years since we
7 really delved into this in any detail at all.

8 MR. HINNEFELD: Okay. I think the
9 issue's clear. I don't think that we
10 necessarily need a written response. I think
11 the issue's clear from the conversation and we
12 should see what we can come up with on that.

13 MR. STIVER: Okay.

14 CHAIRMAN CLAWSON: Well, this is
15 another one of those stepping backwards again.
16 I thought the reason we had brought it up 3
17 years ago was because we'd already brought
18 this information up. And now all of a sudden
19 we're stepping back again. We're losing a
20 little bit of ground now.

21 MR. STIVER: Yes. I was kind of
22 surprised when I saw that because I really

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1 thought that we had had that sewn up. I would
2 suppose there would be other ways to deal with
3 the inability to assign by plant other than to
4 completely abandon the approach.

5 CHAIRMAN CLAWSON: Well if there
6 is we need to --

7 MR. STIVER: We need to have some
8 --

9 CHAIRMAN CLAWSON: Clarification.

10 MR. STIVER: Yes. So I guess for
11 a path forward. I realize everybody's still
12 trying to absorb this. But Brad, would you
13 want us to do a formal response to that? Then
14 have NIOSH go ahead and maybe provide some
15 more.

16 CHAIRMAN CLAWSON: I'm going to be
17 honest here. I've already spoken that I'm a
18 little bit frustrated. I don't know what good
19 it would do you because we've already brought
20 up these issues 3 years ago. And that's why
21 we went --

22 MR. STIVER: If we did a report it

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1 would basically -- the gist of it would be
2 what I just presented here.

3 CHAIRMAN CLAWSON: Right. And so,
4 you know, if NIOSH would like us to give a
5 formal report I guess we can. I just don't
6 see what the good of it would be because we've
7 already been through this once before in
8 detail.

9 Now, if they have something new
10 which I didn't see anything new in it in how
11 their approach was or how they could justify
12 that they could do it that's a different
13 thing. So I guess this has come down to Stu
14 of what would you like us to be able to do.

15 If you want us to formally do it
16 again that would be fine. I think it's a
17 waste of resources my personal self.

18 MR. HINNEFELD: Just so I'm clear,
19 is this issue the only issue with the document
20 we sent? The Rev 1 February 1, 2013 document.

21 MR. STIVER: Yes. It is the
22 issue, yes. It's really the conceptual

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1 paragraph is just in our view is not
2 scientifically valid.

3 MR. HINNEFELD: I'm just, I'm
4 thinking just expediently here if this is the
5 issue then -- I mean the only issue. I don't
6 mean the big one, I mean the only issue then
7 we have enough information to try to see if we
8 can respond to this, to your concern.

9 MR. STIVER: Any other issues
10 would kind of be subsumed within this one.

11 MR. HINNEFELD: If there are other
12 issues within -

13 (Simultaneous speaking.)

14 MR. STIVER: -- 100 percent, every
15 technical detail, but if we were to do a
16 report certainly we might find some other
17 issues as we did more in-depth research. But
18 at first pass given the first order of
19 approximation, this is the big one.

20 MR. HINNEFELD: Okay. I'm just,
21 you know, if this is the only issue then I
22 think we don't need a report from SC&A. It's

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1 pretty clear what it is.

2 There has been in addition --
3 there is a description in this paper. I want
4 to make sure. There's one issue in here that
5 I just described that hadn't been described
6 before. I want to make sure we're okay with
7 that.

8 I'm looking at the bottom of page
9 6 on our report "Fernald Thorium Worker
10 Location Issue Response to SC&A White Paper
11 Rev 1 February 21, 2013." Bottom of page 6.
12 Yes, starting at the last paragraph on page 6.

13 We describe the apportionment of this alpha
14 certainly, the various thorium alpha-emitting
15 -- the various alpha-emitting radionuclides.

16 And in the choice of a triple
17 separated for certain -- actually triple
18 separated when it's favorable and a 50/50
19 split between the thorium-232 and thorium-228
20 when it's more -- when that is more
21 beneficial.

22 MR. STIVER: Yes, this is

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1 something -- this is another change. It
2 hadn't addressed disequilibrium in the
3 previous report.

4 MR. HINNEFELD: Right. Well, I
5 don't expect you guys to analyze it on the
6 phone but in the meantime if there is some
7 issue with this we would need to be -- I'd
8 like to be notified about that rather than
9 have us go do something and then come back and
10 then start dealing with other issues. Because
11 I'm with Brad here, let's get to the end of
12 the ball game.

13 MR. STIVER: Yes, absolutely. I
14 think that we can kind of do this in parallel
15 through emails and technical calls. I would
16 certainly want to have my crew take a look at
17 some of the implications of the other aspects
18 aside from the fundamental construct.

19 CHAIRMAN CLAWSON: And we need you
20 to look at that. But it would be under my
21 impression -- this is Brad again -- that the
22 separation that you're talking about, it would

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1 also depend on how you're going to -- how
2 you're going to implement into the program.
3 That's -- because me and you talked about this
4 the other day on this. It all stems back to
5 that on how you're going to implement it.
6 But.

7 MR. STIVER: The implementation
8 aspect kind of gets back to the fundamental
9 construct. You know, if it's going to be a
10 one size fits all model this is what we agreed
11 that would be appropriate under Revision 3.
12 And all the other aspects of implementation
13 that are laid out here in Revision 4 stem from
14 that fundamental difference.

15 CHAIRMAN CLAWSON: Now, John, my
16 question to you and we didn't touch on this
17 the other day but can you take a look at what
18 they're proposing for this without having how
19 they're going to implement it? I guess, you
20 know, this is kind of a little bit of a
21 different approach.

22 MR. STIVER: Well, that's really

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1 the big issue that we just laid out is -- the
2 way they would lay out an implementation based
3 on the fundamental construct is to assign this
4 95th percentile that would fit which is not
5 claimant-favorable to the most highly exposed
6 group. So that's a showstopper right there.

7 CHAIRMAN CLAWSON: Right. Well,
8 you know, Stu was just bringing up how --

9 MR. STIVER: Are there aspects
10 that might be related? Like I say --

11 CHAIRMAN CLAWSON: Yes, this
12 triple separation or whatever. This is
13 something new.

14 MR. STIVER: Yes, I think this is
15 a disequilibrium issue that really came up in
16 our discussions of the in vivo thorium. And
17 so at first pass I don't really have any
18 problem with that. They're just trying to
19 address, you know, once you get an intake what
20 kind of assumptions are you going to make to
21 give the most claimant-favorable dose under a
22 particular circumstance. So that's really

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1 what that gets down to. It's respiratory or
2 non-respiratory cancer. How would you then
3 give the highest dose and that's really what
4 that comes down to. So in principle I don't
5 have any problem with that.

6 CHAIRMAN CLAWSON: Okay. Well, I
7 just -- I wanted to make sure. I'm like Stu,
8 I just want to make sure that if we get how
9 this is going to be implemented that we -- and
10 this was the only other real change that we
11 saw to this, this Rev 4, right?

12 MR. STIVER: Yes. Yes. That is
13 the big change.

14 CHAIRMAN CLAWSON: Okay.

15 MR. BARTON: John, I think what
16 you're saying is after you get an intake then,
17 you know, all these, the triple separation,
18 all that sort of stuff comes into play. But
19 we're kind of still stuck on how you get to
20 that intake.

21 MR. STIVER: Getting to the intake
22 is the big issue. Once you're there how you

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1 do claimant-favorable assumptions to yield the
2 highest dose for a particular claimant is a
3 separate issue altogether.

4 MEMBER ZIEMER: This is Ziemer and
5 I think that part of it would not be an SEC
6 issue if you got to that point. Yes. So the
7 first question is the more critical one at
8 this point.

9 MR. STIVER: Yes, that's our view
10 exactly.

11 CHAIRMAN CLAWSON: So I know we're
12 not going to be able to solve this here so I
13 guess this is another action item for NIOSH.

14 MR. KATZ: And I think that brings
15 us to the end of the agenda. Is that right?
16 Is there anything else left to talk about?

17 MR. STIVER: That's really it. I
18 would just say that going forward we've had a
19 lot of issues that have kind of been
20 transferred over to the Site Profile bin.
21 They're kind of being held until all the SEC
22 issues are decided.

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1 I would say that it might help us
2 to kind of re-baseline an issues matrix going
3 forward for the Site Profile side of things.
4 And kind of in parallel with resolving this
5 last aspect of the SEC.

6 And getting an idea of when we'd
7 want to meet again. Obviously before the next
8 Board meeting in July. But I guess, yes, that
9 would be something we might want to talk
10 about.

11 MR. KATZ: Yes. I mean I think,
12 John, the one issue with updating the TBD
13 issues is that until you know how some of
14 these play out you don't know what your full
15 plate is there.

16 MR. STIVER: We can get the 80
17 percent solution though. I can at least --

18 MR. KATZ: Yes. I'm just not sure
19 what we're going to do with that in advance of
20 solving these questions.

21 CHAIRMAN CLAWSON: Right. Well,
22 part of this, Ted, is my request. I didn't

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1 want to lose sight of some of it. I'd talked
2 to John earlier about losing sight with some
3 of the TBD issues.

4 We only have -- we have two or
5 three that are in this pile that could be
6 there. I was just kind of asking John to make
7 sure that we didn't lose sight of some of
8 these other ones. Some of these depending on
9 --

10 MR. KATZ: I understand, Brad.
11 I'm just saying that I'm not sure it makes
12 sense to put out a new version of the TBD
13 issues matrix until the dispositioning of
14 these SEC matters. Because they'll impact
15 that.

16 CHAIRMAN CLAWSON: Right.

17 MR. KATZ: That's all.

18 CHAIRMAN CLAWSON: They will. I
19 just -- I'm going to be honest. It's been a
20 long time and we've lost a lot into it. And I
21 was just asking John if he could kind of catch
22 that up for me to make sure where we were at

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1 on some of them. So that's why he was
2 bringing that up.

3 I guess my whole thing was just to
4 make sure that when we get -- when we do get
5 these solved that it won't be a long period to
6 be able to bring that matrix up to speed of
7 where we were at.

8 MR. KATZ: Right.

9 MR. STIVER: I think once we have
10 a good solid handle on what all the Site
11 Profile issues are it would be pretty
12 straightforward to put them all into some sort
13 of an order.

14 MR. KATZ: Right. That sounds
15 good.

16 CHAIRMAN CLAWSON: Well, also the
17 same too if just everybody remembers right.
18 We've been through one, two, three people --
19 and this was my issue -- on SC&A's side. You
20 know, John is the latest one. And I just
21 wanted to make sure that we had --

22 MR. KATZ: So John's going to

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1 stick with it till the end.

2 (Laughter)

3 MR. STIVER: That's an optimistic
4 outlook.

5 CHAIRMAN CLAWSON: That's what I
6 thought about John 1 and Hans but doggone it,
7 they let me down, you know. So now we're at
8 John 2 here.

9 MR. KATZ: I have faith in John 2.

10 CHAIRMAN CLAWSON: Okay.

11 MR. KATZ: Okay. So Brad, are you
12 ready to adjourn or is there something else?

13 CHAIRMAN CLAWSON: Well, actually
14 I wanted to make sure that we went over the
15 items that we have and make sure that we are
16 all on the path forward. I know that SC&A had
17 some and I know that Stu had some.

18 And I just want to make sure that
19 -- or do you guys need a little bit of time to
20 write these up and want to send them out to
21 us? I just want to make sure we are going in
22 the direction that we all have figured that

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1 we're going.

2 MR. KATZ: Why don't we just do
3 that? Why don't we just get a little piece of
4 paper like we normally do back and forth with
5 the action items, just very brief summarize
6 them.

7 MR. STIVER: Yes, that seems to
8 work pretty well.

9 CHAIRMAN CLAWSON: Okay. That
10 would be good. Would that be all right with
11 you, Stu?

12 MR. HINNEFELD: Yes.

13 CHAIRMAN CLAWSON: Okay. Well,
14 with that being said this brings us to the
15 close of the Fernald Work Group. I guess with
16 Sandra on here I was just wondering if she had
17 anything. I know there's not really a public
18 comment but if she had anything that she
19 wanted to say.

20 MS. BALDRIDGE: I do. I'd like to
21 thank the Group for their efforts today and
22 for trying to save the past 3 and a half years

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1 of work. I really appreciate it.

2 MR. KATZ: Thank you, Sandra.

3 Okay, and we are adjourned.

4 CHAIRMAN CLAWSON: Okay. Thanks,
5 everybody, for their help. We'll chat at you
6 later.

7 (Whereupon, the above-entitled
8 matter went off the record at 12:15 p.m.)

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