

This transcript of the Advisory Board on Radiation and Worker Health, Savannah River Site Work Group, has been reviewed for concerns under the Privacy Act (5 U.S.C. § 552a) and personally identifiable information has been redacted as necessary. The transcript, however, has not been reviewed and certified by the Chair of the Savannah River Site Work Group for accuracy at this time. The reader should be cautioned that this transcript is for information only and is subject to change.

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

+ + + + +

ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

+ + + + +

SAVANNAH RIVER SITE WORK GROUP

+ + + + +

FRIDAY
AUGUST 12, 2011

+ + + + +

The Work Group convened via teleconference at 8:30 a.m. Eastern Daylight Time, Mark Griffon, Chairman, presiding.

PRESENT:

MARK GRIFFON, Chairman
BRAD CLAWSON, Member
JIM LOCKEY, Member

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ALSO PRESENT:

TED KATZ, Designated Federal Official

DAVID ANDERSON

TERRIE BARRIE

STU HINNEFELD, DCAS

JENNY LIN, HHS

MARK MAHAFFEY, ORAU Team

ARJUN MAKHIJANI, SC&A

JIM NETON, DCAS

TIM TAULBEE, DCAS

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

2 8:34 a.m.

3 MR. KATZ: Then there's an agenda
4 for the meeting, which is posted at the
5 website at the under the Board section.

6 And, Mark, it's your agenda.

7 CHAIRMAN GRIFFON: Thanks, Ted. I
8 actually should look at the agenda. I was just
9 going to say I believe we have one major focus
10 on the agenda. I just want to make what I say
11 agrees with what's posted. Yes, it should.
12 Okay.

13 The one main item I think is the
14 discussion of the NIOSH SEC Petition ER
15 Addendum, which everyone should have received.
16 Every Board Member I mean should have received
17 yesterday. Jim and -- Brad, I know you have
18 it. Jim, did you receive that?

19 MEMBER LOCKEY: Yes, I have it.

20 CHAIRMAN GRIFFON: Okay. Okay.
21 And then the other part which I've talked to

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1 Tim Taulbee, and Tim can correct me if I'm
2 wrong, but I think since our last Work Group
3 meeting a lot of effort and focus has been on
4 the thorium issues. So the second part is
5 more of just a status update. I didn't want to
6 go through the entire matrix item-by-item. If
7 Tim can just give us maybe a brief update on
8 where he stands on some of the major actions.

9 And then the last section might be to discuss
10 out of the thorium issue discuss what the Work
11 Group if we want to bring a recommendation to
12 the August Board meeting.

13 And by the way for those on the
14 phone, I expect this whole thing to take maybe
15 a couple of hours. So if you're planning your
16 day, I don't think this is going to be
17 certainly a full day, but I expect we can get
18 through this in a couple of hours.

19 So I would just let NIOSH and I
20 assume Tim Taulbee will start off the
21 presentation of the Addendum to the ER.

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1 MR. KATZ: Would everybody please
2 identify yourselves when you speak so that the
3 Court Reporter knows who is speaking in each
4 instance because he may not recognize some of
5 your voices.

6 And lastly, let me just ask
7 everyone on the phone except when you're
8 speaking to the group, would you please mute
9 your phones? There's some background noise
10 now. And if you don't have a mute button,
11 press *6 to mute your phone and press *6 again
12 when you want to come off of mute. But,
13 please, everyone mute your phone.

14 Thank you.

15 And, Tim, it's all you.

16 DR. TAULBEE: Okay. Thank you,
17 Ted, and thank you, Mark.

18 Yes. Yes. My plans here for
19 going over this ER Addendum, and this is
20 actually the second addendum to this petition
21 regarding thorium, is to kind of give a little

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1 bit of an overview of where we're at to remind
2 everybody. And then we'll talk about new
3 information that we've captured and analyzed
4 over the past since the last Work Group
5 meeting. And hopefully this will build an
6 explanation as to how we came to recommend
7 this particular Class.

8 So to kind of back up, back in
9 January SC&A provided review comments on our
10 first addendum. And one of the most, in my
11 opinion, the most significant finding was
12 Finding #3 about us not evaluating thorium
13 exposures in other areas besides the 300 Area.

14 So we agree that this was an area
15 that we had not addressed sufficiently. And
16 so at that time we began to go back to the
17 site and look at other information to try and
18 characterize what other thorium work was going
19 on. Our perception at that time was that the
20 level of thorium work in other areas such as
21 the 773 Area, the TNX Area, separations were

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1 all kind of low-level type of activities as
2 far as not much thorium work going on, just
3 some minor research. And so that was our
4 original opinion.

5 That changed when we did our first
6 data capture, our first data review in March
7 of this year, March 2011, when we went through
8 the classified vaults with SC&A, particularly
9 Kathy Demers and Abe Zeitoun. And what we
10 found there was the inventory reports which
11 catalogued where thorium was on-site through
12 the basically history of this project of
13 making uranium-233. And from those inventory
14 reports it became clear that there was a much
15 larger source term in 773A and the TNX Area
16 than we had anticipated, much larger.

17 And so in addition to those
18 monthly reports we reviewed or those inventory
19 reports, we reviewed the Monthly Technical
20 Reports. And I reported on this at the May
21 Board meeting discussing, giving a little bit

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1 of a preamble of what was to come. But there
2 was a couple of things that we still needed to
3 track down and follow up on, and that was the
4 health physics logbooks for these two
5 particular areas of concern, 773A and the CMX,
6 TNX Area.

7 During this time we also conducted
8 multiple interviews, especially after we saw
9 those inventory reports that were indicating
10 significant quantities, and by "significant" I
11 mean tons of material in 773A. And so we
12 conducted additional interviews to gather more
13 information, more insight, as to what was
14 going on during this time period.

15 So that kind of gives background
16 as to where we were and what we started to
17 look at. What we found from the interviews
18 was that those people were saying it was
19 generally small quantities of thorium that was
20 being worked with in these labs, and this
21 coincided with the reports that we were

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1 seeing, both from the Savannah River Site and
2 other areas. But when we questioned people
3 specifically about the fabrication lab or the
4 metallurgical lab which is in the back part of
5 the 773 building, that was where people kind
6 of backed off of the low small quantities type
7 of discussion. They're indicating well, there
8 could have been more back there because the
9 capability in that back lab, metallurgical
10 lab, was such that they could make an entire
11 fuel assembly basically from scratch.

12 So from our research what we've
13 come to conclude is that the bulk of that
14 material was in that back laboratory in Area
15 773. And I don't know if you have your ER
16 open in front of you, but if you were to turn
17 to page 20, there's a really nice picture
18 which shows 773A lab and it shows where the
19 caves are, the high level caves section 1B,
20 1C. And what I'm talking here is that section
21 2 of part 3. That's the metallurgical lab

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1 where a few -- actually several tons of
2 thorium were handled. This is where they did
3 some research on the metallurgy of the
4 thorium, and this is the area that we had come
5 to the conclusion that we don't feel we can
6 estimate dose for.

7 We know that there was research
8 going on there in the metal fabrication lab,
9 and actually throughout 773A. I'll turn your
10 attention to page 36. And this is a better
11 layout of that whole building. And one of the
12 things I want to point out to the Work Group
13 here is the grayed areas, these are rooms
14 where we identified the thorium work was going
15 on from the health physics logbooks. Within
16 the health physics logbooks there would be
17 entries and discussion about taking smears for
18 thorium. I believe there's a couple instances
19 of air samples. But mostly it was discussing
20 when spills happened and they would give the
21 room number and they went and they did smears

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1 for that particular purpose.

2 And so you can see that in
3 addition to that back metallurgical lab which
4 had extensive thorium, even in section E and
5 section C there were small labs that were
6 doing work, doing research, which was
7 consistent with what most of the people we
8 were interviewing were discussing. That
9 doesn't mean there weren't any exposures in
10 there, even though -- because they're small
11 quantities. Some of the spills were
12 significant that we looked at.

13 This research based upon our
14 limited review of the health physics logbooks,
15 went on literally from 1953 into 1957, early
16 1957. At that point it really appeared to
17 stop. There wasn't hardly any mention of
18 thorium in the logbooks at all after that time
19 period. And this was consistent with an order
20 that came down from DOE, or AEC at the time,
21 that the thorium research or the thorium

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1 activities to make U-233 were really curtailed
2 at that time period.

3 Savannah River had built a thorium
4 processing building down in the TNX Area. The
5 construction was completed at the end of 1956,
6 but the building never went hot. And, in
7 fact, it got turned into another type of
8 facility. It never had thorium enter that
9 particular building because the project was
10 basically cancelled. And this is consistent
11 with what we see from the health physics
12 logbooks, so we've got a lot of consistency
13 going on there.

14 The interesting part is when the
15 further research appeared to stop, within a
16 year or two there was a lot research to begin
17 on neptunium. And what we found from the
18 monthly reports, and we reviewed these in
19 March, was that although they weren't doing
20 work with thorium, they were using thorium as
21 a stand-in for the neptunium research. So it

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1 wasn't research for U-233 anymore, they were
2 doing research for neptunium but using thorium
3 as a stand-in chemical, I guess due to their
4 similar chemical properties.

5 And so that continued on, and then
6 by the mid-1960s the thorium research for U-
7 233 became prevalent again and this is with
8 thorium oxide. And we see the same push that
9 happened over in the 300 Area of making large
10 quantities of thorium slugs, more radiation,
11 there was a second major campaign to produce
12 uranium-233.

13 So one of the things that we found
14 when we were doing this evaluation of 773A and
15 the work from the health physics logbooks is
16 that they really had an active radiological
17 protection program. There were routine
18 surveys in the corridors, most indicated no
19 contamination detected, but there were clearly
20 documented spills and incidents with thorium.

21 And one of the things that struck me from

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1 looking at some of these incidents was one
2 spill indicated 37 counts per minute as the
3 highest smearable contamination from that
4 particular spill, which is pretty low. And so
5 anything that was even low-level spills were
6 considered, you know, incidents and health
7 physics responded to them. And there were
8 other spills that indicated several thousand
9 counts per minute. So they weren't all small,
10 some of them were larger. So clearly there
11 was some potential for exposure in these labs
12 that they were doing this work in.

13 One of the other things that
14 struck me from the health physics logbooks was
15 that the researchers, their conduct of
16 operations and I'll call it sometimes was less
17 than formal. And this is where there would be
18 discussions between -- within the logbooks by
19 the radiation control technicians concerning
20 people doing things that they weren't supposed
21 to be doing or outside the scope of the

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1 special work permit and they would be caught,
2 effectively, and they would be written up in
3 this logbook and reported to the supervisors.

4 And so rad control was actually,
5 you know, really trying to control the areas
6 there. But like any other radiological
7 facility, things are going to happen.

8 Usually those types of incidents
9 aren't a big deal from a dose reconstruction
10 standpoint because we have bioassay or air
11 sampling data and we can still then estimate
12 the dose. The problem with the thorium is
13 that the bioassay data has a very low
14 sensitivity, and this is why we had never
15 proposed to use it. And if you'll recall from
16 the bioassay data, we only have data from
17 1956, and this comprises data for 175 workers.

18 Early indications from the health physics
19 logbooks early prior to 1956, I believe it was
20 around 1954, 1955 time frame, was that they
21 were beginning to compile a list of all the

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1 workers who ever worked with thorium. So
2 which kind of explains a little bit of why it
3 is that thorium bioassay logbook only
4 indicates 773A as people who were monitored.
5 And it appears that the health physics control
6 group there started compiling a list of these
7 people.

8 Now the problem is we don't know
9 if this a complete list. The list that they
10 were talking about we have never been able to
11 find to identify that, yes, these are the only
12 people that worked with thorium in 773A or,
13 you know, any other information about it. It's
14 just that we have the thorium bioassay logbook
15 and then we have the sanitation in the health
16 physics logbook indicating that they were
17 compiling a list of workers who worked with
18 thorium to do follow-up bioassay, by the way.
19 That was specifically stated.

20 So it appears that they followed
21 through in 1956 as the program was being

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1 curtailed that they followed through with
2 monitoring workers there. But, again, we don't
3 have a way of confirming it.

4 Other data within 773A is air
5 sampling data. Now in the other areas around
6 Savannah River, particularly the 300 Area, the
7 100 Areas, the 200 Areas we have air sample
8 logsheets that are numerically -- that are
9 numbered. And so starting with a particular
10 day in 1955 you'll see an air sample logsheet,
11 and the next day and the next page will be
12 either one the same day or another day; and
13 they go in sequence. We've not been able to
14 find that for 773A nor for TNX. And my best
15 estimate as to why we can't find it is these
16 were two different divisions.

17 773A and TNX were operated by the
18 Savannah River Site Technical Division, not
19 the Production Division. And so there was
20 basically three divisions, The Technical
21 Division, the Production Division and the

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1 Construction Division.

2 So we haven't been able to find
3 any of the data or a significant amount of the
4 data, especially air sampling data from this
5 time period. There's some interfacings in the
6 logbooks, but nothing that I would consider
7 complete. Plainly, they were doing air
8 sampling in those buildings. There was
9 annotations about checking all of the air
10 sampling data, and no abnormals; that type of
11 entry. But one of the things from our
12 interviews that we've conducted is we found
13 that the air sampling in these laboratories
14 was not breathing zone representative. Unlike
15 the 300 Area where we talked to a person,
16 talked to the rad tech who took the samples
17 and indicated the position of the sampler at
18 nose height, where the workers were working
19 when he took his ten-minute or five-minute
20 sample, the laboratories that we were looking
21 at people were all indicating that the air

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1 samplers were on the ceilings or on the walls,
2 so they're really not breathing zone
3 representative even if we're able to find
4 them.

5 There was some smear data within
6 these health physics logbooks. Most of it
7 indicates no contamination detected unless
8 there is a spill. But the way these logbooks
9 are filed, we only looked at a small sampling
10 of them. The logbooks are actually filed by
11 individual radiological control technician's
12 name. So once they filled up a logbook, they
13 filed it off and it went off to the Records
14 Center and it was filed as their logbook, even
15 though they weren't the only technician making
16 entries in there. So it wasn't that every
17 technician had their own logbook, it was kind
18 of whoever started that particular log, it's
19 filed under that person's name, which makes it
20 very difficult to find at this time.

21 As I indicated, you know it's

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1 clearly that they were doing checks of the
2 labs, but it's not clear where these routine
3 samples within the labs were taken. Sometimes
4 in the logbooks they would indicate the
5 samples were taken at the edge of the hoods,
6 other times they indicate -- or they don't
7 indicate where the location was.

8 So even if we had all of the smear
9 data and all the air sampling data, I'm still
10 not sure we could actually develop an exposure
11 model that would be reasonable for this
12 particular population.

13 So the final thing that we could
14 do for dose reconstruction would be something
15 like a source term model. The problem with
16 that for 773A was we were looking at different
17 chemical forms and different physical forms in
18 every laboratory and within the laboratories.

19 Mostly the material back in the metallurgical
20 lab, that's a lot better in that it was just
21 metal. But in the laboratories they were

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1 actually doing some dissolving of irradiated
2 thorium and taking it from a metal slug all
3 the way into a solution and then extraction.
4 And when I say "a section of the metal slug,"
5 I'm meaning a very small section, I'm taking
6 like an 8 milliliter out of it.

7 So small quantities quite highly
8 radioactive due to the irradiation component
9 of that, but trying to do a source term model
10 for this particular facility I think would
11 just be virtually impossible. We don't have
12 enough information to try and track down where
13 all the material was all of the time, all of
14 the different chemical and physical forms and
15 how it was handled within the lab.

16 So without having bioassay data,
17 air sample data, smear data and not really
18 being able to model the source term, we're
19 pretty much left with designating an SEC for
20 this building for thorium. And so that's how
21 we came to the conclusion to include 773A into

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1 the -- or recommend to you all to include it
2 in the SEC.

3 Let me pause here for a second.
4 Does anybody have any questions at this point?

5 (No response.)

6 DR. TAULBEE: Is anybody still
7 there?

8 MEMBER CLAWSON: Yes, we're here.

9 We're just trying to stay on mute.

10 I don't have any questions.

11 This is Brad.

12 DR. TAULBEE: Okay. Thanks, Brad.

13 I just wanted to make sure I didn't get
14 disconnected and I'm just talking to myself.

15 MEMBER CLAWSON: No.

16 MEMBER LOCKEY: No, I heard. I
17 don't have any questions either.

18 Jim Lockey.

19 DR. TAULBEE: Okay. Thanks, Jim.

20 Okay. Let me move on to the TNX
21 Building or the semi-works. And this is

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1 really CMX and TNX, but I'm going to focus on
2 TNX and let me explain why.

3 The CMX/TNX Area was a semi-works
4 plant is what it's called there. Other people
5 might call it a pilot plant. This is an area
6 where Savannah River went from the benchtop
7 scaling in those laboratories of 773A into
8 semi-production. And this is where they would
9 scale up from a beaker to, you know, a 100
10 gallon tank, or something along those lines.
11 And so when we started looking at what
12 operations were going on there, the CMX
13 facility supported reactor research and
14 reactor development and the TNX supported
15 separations.

16 So CMX basically handled mostly
17 canned slugs of thorium, and from that
18 standpoint they were doing thermodynamic
19 testing on the slugs themselves; they would
20 heat up the water and see how they would
21 respond in a reactor. Even though they didn't

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1 have a reactor down there, they were just
2 doing heat-transfer types of tests; fuel flow,
3 thermodynamics, heat-transfer. And it was
4 mostly with encapsulated thorium.

5 TNX, on the other hand, were
6 chemical separation semi-works. And this was
7 dissolving chemical extraction, taking whole
8 non-irradiated thorium slug and dissolving
9 them down and trying to add things, catalysts
10 to improve the dissolving -- accelerate at the
11 time of that particular step. And so
12 everything was scaled up from the lab and they
13 were doing this down there at TNX.

14 In reality, you can't separate CMX
15 from TNX workers. There is a picture of the
16 CMX/TNX facility. Let me flip to that here. I
17 believe it's page -- page 21 of the ER. And
18 you can see, these two buildings are right
19 next to each other. So going into this area
20 is where you would be badged. So in reality, I
21 can't separate out who worked in CMX, who

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1 worked in TNX, but TNX is really the area that
2 would cause us concern from an unencapsulated
3 thorium exposure standpoint, which is why
4 we're recommending it.

5 The internal monitoring is similar
6 to 773A. Again, no bioassay for this area.
7 We also don't have any air sample data for
8 this area.

9 The health physics logbooks, we
10 did find a one for this particular area. We
11 could probably locate more, although the one
12 logbook again was much like 773A. It didn't
13 give locations of where the surveys were
14 conducted. It didn't give -- most of the time
15 there was no smearable contamination detected
16 unless something happened, and then there'd be
17 some wipes and discussion of smears.

18 And the source term to try and
19 estimate dose is similar to 773A but not quite
20 as complex. And by the time you got down to
21 the semi-works plant, they had a pretty good

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1 idea of which of, you know the two to three
2 methods would be best. And so they really
3 didn't have the dozen or so different
4 operations for dissolving thorium that were
5 going up in the 773A Area. So it was less
6 complex, but still you got similar issues.
7 Within one process line, the whole purpose was
8 to take an irradiated slug and dissolve it
9 down into a solution and separate out the
10 uranium-233. So that was their whole goal.

11 So in dealing with the semi-works
12 TNX area we didn't feel like we could estimate
13 the dose for this area, and so we wanted to
14 include this in the SEC as well.

15 Another area that we looked at and
16 followed up was the burial grounds. And this
17 is something that the health physics logbooks
18 really helped illuminate. Now we found back
19 when were doing the research from the 300 Area
20 and Addendum 1 and Report 46 that material
21 leaving from the 300 Area to the burial

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1 grounds was surveyed. They would take smears
2 on this and then they would send it out to the
3 burial grounds. A significant portion of the
4 logbook entries for 773A and TNX were just
5 that. It was sending material, leaving the
6 building, some going to the burial grounds,
7 some going to other areas, going to the 300
8 Area or the TNX area. And so whenever
9 material was moving between these regulated
10 areas, between these radiation control areas
11 effectively, it was surveyed. And so we don't
12 really feel that there's any potential for
13 internal contamination there at the burial
14 grounds due to thorium.

15 The other interesting component of
16 this was the high level cave waste when it was
17 leaving 773A to go to the burial grounds
18 before it was surveyed it was encapsulated in
19 concrete and then sent to the burial ground.
20 And this was due to these were irradiated
21 plugs, and so they had a high gamma component

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1 and so they wanted to reduce the dose rates,
2 so they encapsulated them in concrete and then
3 sent them out. So, again, we don't really
4 feel that there's a potential for exposure
5 here at the burial grounds.

6 The 200H separations is the next
7 one that I want to discuss. And this is, the
8 only thing that's important to remember with
9 this particular process was the product was
10 uranium-233, not thorium. And by the way, for
11 the 200 separations, now I'm talking 1964 to
12 1972 time frame.

13 During this time period the
14 product was U-233. Coming out of the reactors
15 these slugs have a rather high dose rate. And
16 what I'm talking is in the r per hour type of
17 range. So these were transported in shielded
18 casks. They were taken from the shielded
19 casks by an overhead crane and lifted and put
20 into the large canyon cells for dissolving.
21 So there's really a minimal potential for

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1 exposure on the front end here.

2 At that point in the canyons, and
3 Brad and Mark when we toured those canyons you
4 remember seeing from the crane view those
5 remote cameras that would move from one cell
6 to the next cell all the way through the hot
7 canyon side into the warm canyon side the
8 product would. And then the final uranium
9 solution that would be coming out of this
10 would go up the B line. And at that point
11 during the first campaign the thorium and the
12 mixed fission products were pumped directly
13 out to the waste tanks as high level waste.

14 After that first campaign,
15 Savannah River decided to start trying to
16 recover that thorium, and so they added a
17 hold-up tank for the thorium nitrate. And so
18 they went through the whole process. The
19 uranium goes up to the B line, the mixed
20 fission products go out to the waste tanks,
21 and the thorium went into a hold-up tank there

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1 at the end of the canyon.

2 From that hold-up tank it was
3 transferred to railroad cars. It was pumped
4 directly into the railroad cars. We found
5 that these railroad cars were equipped with
6 filtrate -- filters to prevent particulate
7 contamination during the filling, and also for
8 thermal expansion. This material was stored
9 in these railroad cars for actually several
10 months, and I believe over a year in one case
11 before being sent to Fernald. So it was
12 stored there on-site in the railroad cars.

13 Now due to the high photon dose
14 rates from this material, and I'm not talking
15 r per hour now, it's back down to the mr, but
16 it is still significant. These railroad cars
17 were roped off and they were inspected via
18 binoculars for leaks. So people weren't going
19 up to them, they weren't lingering around them
20 during the time period. They were kind of
21 isolated until they got clearance that Fernald

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1 could handle them, and they were then sent to
2 Fernald.

3 So because of this particular wet
4 process operation, the filters on the railroad
5 cars, Savannah River roping these railroad
6 cars off, inspecting with binoculars, we
7 really don't feel that there's a significant
8 potential for internal exposure from this
9 process either.

10 So this pretty much left us then
11 with a proposed Class for the 773A and the TNX
12 Area. And before I go into the Class
13 Definition, I will pause here and see if
14 anybody has any questions.

15 MEMBER CLAWSON: Hey, Tim. This is
16 Brad.

17 Now you're telling me that they
18 roped off these railroad cars and just looked
19 at them with binoculars, period. I kind of
20 have a little bit of a hard time with that,
21 because per a lot of your inspection criteria,

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1 you know you've got to be able to check it for
2 so many things. It's like my casks right now.
3 I have to physically go out there and look for
4 any cracks or degradations that could create
5 something. I have a question on that because
6 it sounds real good to me, but I just -- I
7 really have a hard time with that.

8 So I just want you to keep that in
9 the back of your mind. I'll let you continue
10 on because things may clear up. But I do have
11 a little bit of a question there.

12 DR. TAULBEE: Okay. I thank you
13 for that, Brad.

14 This is what we found from the
15 reports where they talked about isolating
16 these such that people wouldn't be around them
17 and they were trying to minimize the exposure
18 to the people doing the inspection, and so
19 this was a method to try and do that.

20 MEMBER CLAWSON: Yes.

21 DR. TAULBEE: So, that's just the

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1 information we have. But thank you for that.

2 MEMBER CLAWSON: And I understand
3 that. You know, because in the back of your
4 mind you've got to look at something. They put
5 a lot of this in because they were worried.
6 Something triggered it to make this a big
7 problem. So I just -- you know, I just wanted
8 to keep that in the back of your mind, and
9 we'll continue on.

10 DR. TAULBEE: Okay. Yes. By the
11 way, the big problem here really was the
12 photon dose rate, so that was why they were
13 doing it, at least that's what the
14 documentation says was the dose rate.

15 DR. MAKHIJANI: This is Arjun.
16 May I ask a question?

17 DR. TAULBEE: Sure.

18 DR. MAKHIJANI: I mean, you
19 determined that there was no significant
20 exposure potential at these railroad cars.
21 But how did you extrapolate that to the

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1 reprocessing plant in general?

2 DR. TAULBEE: And this is where I
3 hope that Mark and Brad can help me out. If
4 you look at how the canyons are designed,
5 people don't go where this material was being
6 dissolved. It's moved from one cell to the
7 other all remotely, the different extractions,
8 dissolve them down, the columns were set for
9 chemical separation. These were remote.

10 Due to the extreme high dose rate
11 from the fission products that are within
12 these particular slugs, and in this case
13 protactinium that was causing a very high dose
14 rate that was causing lots of problems for
15 them. And so there really wasn't any
16 potential during that dissolving process. You
17 know, once the process was done, they flushed
18 the systems. And if they were doing a
19 modification of one then they're flushed
20 first, then they're pulled out, and I just
21 don't see where there's any major -- or

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1 potential here for an internal exposure during
2 these campaigns.

3 So that's how I came to that
4 conclusion. Is people aren=t standing next to
5 these next tanks or being able to get to these
6 tanks and then after they got material in
7 them, the dose rate is so high that people
8 aren't working on them. They're done by remote
9 from a crane overhead lifting this entire
10 pallet down into the cell. And I think Brad
11 and Mark, you remember standing out there
12 outside of the canyon area seeing those
13 pallets that have all the piping and tubes and
14 tanks and so forth.

15 MEMBER CLAWSON: Yes.

16 CHAIRMAN GRIFFON: Tim, this is
17 Mark.

18 Yes, I do remember that, and I
19 think generally you know that's an accurate
20 description. I would question, you know if
21 there was a path for exposure. The only parts

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1 of it that I don't know enough about to really
2 speak to or historically, would be whether
3 there were opportunities for exposure through
4 maintenance and things like that where in
5 between runs, you know, did parts of the
6 system get contaminated, did workers have to
7 go in there? You know, that part I wouldn't
8 know. The general processing I think you
9 accurately describe though.

10 DR. TAULBEE: Yes. I think --

11 CHAIRMAN GRIFFON: At least from
12 my understanding, yes.

13 DR. MAKHIJANI: This is Arjun.
14 Yes, I know that reprocessing is done by
15 remote control. But the implication of what
16 you just said, Tim, is that generally in
17 reprocessing operations there's no internal
18 exposure potential to uranium/plutonium
19 fission products. And I don't think that the
20 actual monitoring records would sustain that.

21 There is internal exposure

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1 potential documented by internal exposures to
2 reprocessing workers in the 200 Area. There's
3 also internal exposure documented to tank farm
4 workers.

5 So, you know while filling
6 railroad cars is not the same as tank farm
7 work, there are considerable similarities.

8 And I'm just raising a question as
9 to how you did this extrapolation. And
10 basically I'm hearing that you say the
11 position is there's no exposure potentials for
12 internal -- there's no internal exposure
13 potential in the reprocessing process
14 altogether. So, I just want to clarify that;
15 that's all.

16 DR. TAULBEE: Okay. Thank you.

17 And let me explain that --

18 CHAIRMAN GRIFFON: This is Mark.

19 I guess I should say if I said no,
20 I didn't mean to say no. I think lower. I
21 would tend to think from the -- of what they

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1 did, I would guess that it was a lower
2 potential. But, you know, no I wouldn't go so
3 far as saying no potential.

4 DR. MAKHIJANI: And that can be
5 verified by comparing canyon --

6 CHAIRMAN GRIFFON: Yes.

7 DR. MAKHIJANI: -- exposure
8 potential with other areas --

9 CHAIRMAN GRIFFON: Yes.
10 Absolutely. Yes.

11 DR. MAKHIJANI: -- we have data.

12 DR. TAULBEE: Let me explain just
13 a little bit further here. You're absolutely
14 right, Arjun. In the 200 Area there were
15 plutonium exposures and uranium exposures.
16 But if you think of the process that was going
17 on for making plutonium, the irradiated slugs,
18 the uranium irradiated slugs came into the
19 canyon. They were dissolved down. And the
20 plutonium nitrate then went up to the B line
21 for further separation. That area is where

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1 the plutonium intakes would be occurring;
2 where the plutonium nitrate was then taken
3 back into metal, you know it was taken to
4 plutonium fluoride. The neutron, there's
5 neutron exposures then. And that's where
6 those plutonium exposures would be occurring.

7 The uranium exposures within that
8 area would be when the uranium went down the A
9 line for recycling, basically to extract out
10 the uranium again and recycle it and reuse it.

11 So both of those two when you're
12 talking about exposures for internal, those
13 were the two main pathways for alpha emitters
14 within the 200 Area.

15 DR. MAKHIJANI: Yes.

16 DR. TAULBEE: In the tank farm
17 area, you're talking mixed fission products.
18 Well, the same -- this particular process, the
19 mixed fission products would then go to the
20 tank farm areas and its mixed fission
21 products. In this particular case with the

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1 thorium, the thorium didn't go down an A line
2 for extraction back into thorium metal and is
3 pumped directly to a rail car. The uranium
4 that was separated from the thorium actually
5 went to the B line down the same path that the
6 plutonium would be. So from a uranium-233
7 standpoint, yes, I would agree that there was
8 a potential for internal exposures to U-233
9 from that process. But for the thorium, it
10 was just in this hold-up tank and then pumped
11 to the railroad cars.

12 And I also agree with what Mark
13 said a few minutes ago. You know the
14 potential for exposure was lower, I agree. I
15 misspoke if I said there was no potential. I
16 apologize for that. I would say that the
17 potential was very low here such that any
18 doses that we had from uranium metal work over
19 in the 300 Area where there's grinding and
20 welding and so forth on these slugs, I feel
21 that the doses would be bounded because this

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1 is a wet process and it was only limited
2 exposure during that pumping operation and
3 then it was stored there in the railroad cars.

4 This is why we haven't included this in the
5 SEC.

6 DR. MAKHIJANI: Yes. Now in our
7 review of your Report 46 we did point out that
8 recycled thorium was handled in the 313M Area.
9 Where did that come from?

10 DR. TAULBEE: Well, that would
11 probably be coming back from Fernald after it
12 would go to Fernald, be turned back into metal
13 -- in this case, this time period actually it
14 would come back as thorium oxide.

15 But remember, in the 300 Area we
16 have lots of uranium bioassay. And I mean a
17 lot of data. A lot of bioassay for uranium.
18 And so --

19 DR. MAKHIJANI: I'm not talking
20 about uranium. I'm talking about recycled
21 thorium.

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1 DR. TAULBEE: Right. But recycled
2 thorium, the contaminate would be uranium.

3 DR. MAKHIJANI: Well, no. I'm
4 talking about exposure to thorium, not the
5 exposure -- there would also be exposure to
6 fission products as well as U-233. So it's
7 not just -- there would be mixed -- there'd be
8 exposure to uranium-232, there's neutron
9 exposure potential. There are lots of
10 complications with recycled thorium.

11 DR. TAULBEE: Okay. I'd have to
12 see more from that standpoint from you on
13 that. We do have what the assay was of the
14 thorium that came out that was sent back to
15 Fernald. So we do have the U-233 content and
16 I believe, again, the component measurement as
17 well for that. So we do have data on the
18 recycled thorium that was sent to Fernald. So
19 that was turned back into a thorium powder and
20 was sent to Savannah River for, you know the
21 whole recycle path. We do have data on it.

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1 DR. MAKHIJANI: I'm just raising
2 questions. Because, you know I've only
3 briefly looked at your report, of course.

4 DR. TAULBEE: Right. I understand.
5 And I apologize for this not getting to you
6 all sooner. I really hoped that it would.
7 Sorry about that.

8 CHAIRMAN GRIFFON: This is Mark
9 Griffon. I did want to say one thing, Tim,
10 that I think that's probably a general thing
11 from this call today is that, you know this is
12 good -- it's definitely worthwhile you going
13 through this and giving us this background. I
14 think -- as we get towards the end of this
15 call we probably want to hone in on your
16 proposed Class and sort of discuss that. But I
17 think what we're going to have to say at the
18 end of the day is that, you know, even if the
19 Work Group is going to make a motion to bring
20 to the Advisory Board regarding the proposed
21 Class, I would also say that SC&A has

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1 additional comments or questions or needs more
2 time to consider the other operations and
3 whether we're ready to say they would be
4 bounded by the current approach, that sort of
5 thing. I think that sort of stuff is going to
6 have to probably wait for more analysis -- you
7 know, more discussion and work between all of
8 us.

9 So anyway, I think that's where we
10 want -- our goal today would probably be to
11 flush out the proposed Class, anyway, by the
12 end of the call.

13 DR. TAULBEE: I fully understand
14 that, Mark. Would you like for me to go over
15 the proposed Class and how we came up with
16 this Definition?

17 CHAIRMAN GRIFFON: I didn't mean
18 to cut you off if you have more on the
19 operational end, just to go through. Because,
20 quite frankly, this is a good background
21 discussion for me and for all of us I think to

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1 hear. But if you're ready, you know, if you
2 don't have any more sort of other thorium
3 operations that you've considered in putting
4 together this document that you want to go
5 through then -- I'll leave it up to you, I
6 guess.

7 DR. TAULBEE: Okay. The only
8 other area that we covered here within the
9 report a little bit were the reactor areas.
10 And I believe I discussed that some at the May
11 Board meeting where, you know, it was
12 encapsulated thorium at that point, so --

13 CHAIRMAN GRIFFON: Why don't you
14 just through that and then go into the Class,
15 and that'd be good.

16 DR. TAULBEE: Okay.

17 MEMBER CLAWSON: Okay.

18 DR. TAULBEE: Well with the
19 reactors, if you recall from the whole process
20 once the thorium is canned in the 300 Area, it
21 is then sent to the reactor area for

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1 irradiation, and so at that point the
2 individual slugs are loaded into full
3 assemblies -- fuel assemblies. These are then
4 lifted into the reactor for an extended period
5 of time. The slugs would be irradiated,
6 basically creating uranium-233. At the end of
7 the cycle these fuel assemblies would be
8 lifted out of the reactor, again remotely,
9 directly put into a transfer channel that
10 dropped down into the disassembly pool, that I
11 think Brad and Mark, you guys might remember
12 walking around. And at that point those fuel
13 assemblies were allowed to sit for a number of
14 days to cool and to allow the short lived
15 fission products to decay off. And then these
16 fuel assemblies would be unloaded. Basically
17 they're under water. The assemblies would be
18 unloaded, the individual slugs would be put
19 into a cask. The cask then sealed, lifted
20 out, put onto a rail car and sent to the 200
21 Area.

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1 So because we're starting with
2 sealed thorium slugs and we are ending with
3 steel canned highly radioactive now thorium
4 slugs going out of the building, I don't see
5 any potential for the internal exposure in
6 this particular area. There were times when
7 they would take a slug, a few slugs out and
8 they would do some visual inspection. We
9 found reports of this. They would do
10 basically non-destructive testing. They were
11 very concerned about the warping of these
12 slugs and how much the dimensional changes
13 might be due to heat within the reactor. And
14 so we found quite a few reports on this type
15 of an operation.

16 And there's no indication of any
17 of these being -- I shouldn't say no. There
18 was some slug ruptures, but not significant. I
19 can only recall one report talking about a
20 thorium slug rupture and when this occurs,
21 remember they're coming out from the reactor

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1 into a water pool under that walkway area that
2 we walked though and they're kept under water
3 at that point.

4 So the main hazard when one of
5 these ruptured was actually the iodine and the
6 fission products, the gaseous fission products
7 coming out. That's the major concern. These
8 are kept under water and some of these gases
9 come out and will bubble up and cause dose to
10 people. But it's not due to the thorium at
11 that point.

12 So when this occurs, the slugs
13 will be sent over to the high level caves in
14 773A for further analysis as to what happened.
15 So this is why we have not included the
16 reactor areas within this particular Class
17 Definition, within this proposal, is we just
18 don't see a potential for internal exposure
19 here that is significant.

20 So with that, that pretty much
21 covers all of the areas. The only other area

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1 that's out there is the 400 Area, and that's
2 the heavy water plant, and there's no evidence
3 that thorium was ever there in any quantity
4 from those inventory log sheets.

5 These other areas that I've
6 discussed clearly in the 300 Area, the 773A,
7 the TNX, the reactors, they all had very
8 significant quantities of thorium according to
9 those inventory logs.

10 So with that, we're looking at how
11 can we identify who was potentially exposed in
12 773A and TNX from other workers down-site.
13 And in particular, you know you got the 400
14 Area workers that were exposed to tritium.
15 They were doing heavy water separation and
16 reprocessing this heavy water coming from the
17 reactors. So, you know, when somebody=s
18 bioassay indicates they worked in the 400
19 Area, their dosimetry records indicate they
20 worked in the 400 Area, we interviewed them
21 for dose reconstruction, they indicated they

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1 worked in the 400 Area. There's really no
2 potential for exposure to thorium for this
3 type of a worker.

4 So we started looking at how can
5 we identify a Class of workers who were
6 exposed. And we ended up looking at the
7 external dosimetry data. Within all of these
8 areas where thorium was worked with, it was
9 required that people wear a film badge
10 dosimeter. This is in procedures. It's been
11 documented or confirmed through interviews
12 with workers. We've specifically asked them
13 "Could you have worked in one of these areas
14 without a film badge?" And the answer came
15 back no, that people were monitored going into
16 these areas wearing a film badge.

17 It kind of plays out from when we
18 look at the claimant populations for Savannah
19 River, 80 percent of the claimants that we
20 have have external monitoring data. So it
21 bears out that Savannah River was monitoring a

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1 tremendous number of people for external
2 radiation.

3 So from that standpoint we felt
4 that these regulated areas, 773A and the TNX,
5 you had to have a film badge to go into them.

6 Could we use the dosimetry codes? Well, it
7 turns out we feel we can.

8 At the bottom of the early cards,
9 early dosimetry cards, this will be 1953
10 through 1957, at the very bottom of the card
11 it lists the area where the individual worked.

12 And it would be A area, G area, TNX, CMX. It
13 could also indicate T reactor, R reactor, L,
14 the F area, the H area, D area. And so just
15 from looking at an individual's card you can
16 tell where they were monitored.

17 CHAIRMAN GRIFFON: Tim, this is
18 Mark Griffon.

19 DR. TAULBEE: Yes, sir.

20 CHAIRMAN GRIFFON: Can I ask a
21 question? It's hard to interrupt when we

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1 can't see each other.

2 But just while I'm thinking of it,
3 the question I have and this does get to the
4 heart of this Class question I think for most
5 of us, is you know the determining who had
6 access and not. But, I mean, you said you
7 talked to many people and they all agreed that
8 you had to have film badges to go in. But did
9 they have to have film badges with that
10 notation on the bottom for the particular
11 building? I mean, access control is different
12 then requiring a film badge to enter certain
13 areas, isn't it? And can you speak to that a
14 little bit?

15 DR. TAULBEE: Absolutely. You're
16 absolutely correct. And this is why as you'll
17 see here in a minute, we've included the G
18 area for this early time period and why you'll
19 see for the second time period why we included
20 that 6B through 6Z series and 12D through 12H
21 and 12J through 12Z is to account for those

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1 people who might have been badged from other
2 areas that could have worked in 773A. So we
3 have tried to address this directly.

4 Bear with me here and I think I'll
5 be able to explain this. I hope.

6 CHAIRMAN GRIFFON: Sorry to
7 interrupt. Okay.

8 DR. TAULBEE: Oh, no problem. No
9 problem whatsoever.

10 Okay. So with this early time
11 period we have these dosimetry cards that are
12 in each individual's file. For people who are
13 more along the construction trade, there are a
14 separate type of card that we see where their
15 dosimetry is also entered on an individual
16 card. Visitor type of badge information, so
17 construction trades going into this area will
18 have one of these little visitor card tablets
19 that we see. And on there it will indicate
20 the area that they may have worked in.

21 So whenever somebody has a

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1 dosimeter code that is A, G, CMX, or TNX we
2 consider them to be included in the Class.
3 And that G area basically covers all of the
4 central shops workers all during that time
5 period. So all the construction trades who
6 might have gone into 773A and conducted
7 renovations, which by the way the logbooks
8 bear out. The health physics logbooks clearly
9 discuss when renovations were going on and,
10 you know, construction trades workers coming
11 into the area and then briefing them on the
12 work that needs to be done. And so health
13 physics was involved with this. I'm quite
14 confident that these people were monitored and
15 that we have those records from looking at
16 these dosimetry codes within their records.

17 This early time period, and this
18 is a little bit confusing as to why we went
19 January 1, 1953 to December 31, 1957 is purely
20 due to a change in the recording practices at
21 the site. It doesn't change anything with

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1 exposure potential. It just changes how they
2 started monitoring or recording the dosimetry
3 badges.

4 Prior to 1957 all of the data is
5 recorded on these individual cards and they're
6 filed by a person within the dosimetry lab.
7 So when people file a claim with us, the
8 dosimetry lab who will issue records there at
9 Savannah River goes to their stacks, goes to
10 their microfiche and pulls out an individual
11 worker's card and they send them to us. And
12 so we can look at these cards and we can see
13 all of these different areas where an
14 individual worked.

15 Starting January 1, 1958 they
16 started using an IBM system, an electronic
17 computer system to record their data. At that
18 time they changed how the dosimetry codes were
19 being recorded. So instead of just A area,
20 they started indicating basically more
21 information within A area.

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1 I'll ask you all to go to a
2 certain page. Let's go to page 41 of the
3 Evaluation Report. I'll give you all a second
4 to get there.

5 This is the table that discusses
6 the early time period that I was just talking
7 about where we were discussing the different
8 separations area, the manufacturing area,
9 heavy water, the technical and semi-works
10 areas, A Area supports, reactors and central
11 shops. And what you'll see there in that third
12 column of Table 7-4 is the area designation
13 that we find on those dosimetry cards. Then
14 the other columns you're seeing was
15 unencapsulated thorium, encapsulated thorium
16 and then whether we feel that they should be
17 included in the SEC based upon whether we can
18 reconstruct doses for those areas.

19 So this covers that early time
20 period up to 1957 -- up to 1958, rather. If
21 you flip the page to page 42, you'll see Table

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1 7-5 has the area codes for the same areas and
2 you'll see that the HP area codes has changed.
3 Instead of it being F Area or just an F there,
4 the HP code was 1A. 2A was the 200H, 3A was
5 the 300M, 4A was 400D, 773 was 5A, 777M which
6 is over in M Area next to the 300 Area so
7 they're doing those reactivity measurements on
8 thorium, not doing any other manipulation with
9 the thorium, that code would be 5D. The CMX,
10 TNX Area was 5C. The A Area support is
11 actually goes 6A through 6Z.

12 We excluded 6A from this
13 particular definition and that's because 6A
14 designated Building 703. And 703 is that
15 large white building that's the administration
16 building that you can see from the road when
17 you first pull in. This is where all of the
18 managers and so forth from the entire site
19 would be located. And they were badged out of
20 that area because they basically went anywhere
21 on site. So instead of moving around -- or

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1 picking up a visitor badge everywhere, I
2 believe they badged them directly out of that
3 building. I don't believe that those managers
4 and so forth would spend a significant amount
5 of time in any of these areas such that they
6 would be exposed to thorium for an extended
7 period, you know, 250 day type of scenario.

8 Other people around the 700 area,
9 though, could have been. And that's why we
10 included those 6B through 6Z. Somebody
11 working over in 723, which we was an add-on to
12 the metal lab for a short period of time,
13 could have gone over into the other metal lab
14 to do some work for, like I said, 250 days
15 over this 20 year period. And so because
16 people were badged out of these other
17 buildings in that 700 Area -- complex area, we
18 feel that they should be included in the
19 Class. So that was why we included them.

20 The 7A dosimeter codes are the R
21 reactor. 8A is the P reactor -- I'm back on

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1 table 7-5 right now. 9A would be the L
2 reactor, 10A is the K reactor, and 11A is the
3 C reactor.

4 And then you got the 12 series.
5 And these were all the central shops areas.
6 These are all construction trades workers.
7 You'll see here that we have excluded 12A, B,
8 and C, and the primary reason for this is 12A
9 was the locomotive shop. So these would be
10 people that worked on the trains that were
11 hauling materials back and forth.

12 12B was the traffic and
13 transportation shop. This was where
14 maintenance was done on all of the vehicles on
15 site. And then the 12C was traffic and
16 transportation office. And, again, people who
17 are handling how traffic and transportation
18 and how cars are signed out and so forth. We
19 just don't feel that there's a potential for
20 exposure to thorium for those people.

21 The other shops in that area,

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1 however, 12D through 12H, this is including
2 carpenters, the carpenter shop, the
3 boilermakers, the pipe fitters, the glazers,
4 all of the other construction trades workers.
5 They were separated by dosimetry code by shop
6 where they were issued their badge out of the
7 shop. All of them could have gone to 773A,
8 all of them could have gone to TNX for
9 extended periods of time doing these
10 renovations in these areas, and so therefore
11 we feel they should be included in the SEC.

12 We excluded in particular 12I. And
13 this was because this was from the temporary
14 construction area, this was the B Area. And
15 this is the area where -- it housed the
16 offices of procurement, payroll, medical,
17 accounting, timekeeping, and the management
18 offices for the construction division. So
19 these weren't workers. Well, they were
20 workers, but they aren't trades workers per
21 se. These were the people handling all the

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1 administration for construction trades, and
2 they were badged out of that particular area,
3 out of that designation 12I. And so we've
4 excluded those individuals as well because we
5 just don't see that people from construction
6 payroll would have been up in 773A working and
7 being exposed to thorium during these time
8 periods.

9 So this Class Definition is unique
10 due to the thorium being located in two areas
11 that we are having difficulty and we don't
12 feel we can estimate the dose and so to
13 identify workers who were working there we
14 kind of split it into three categories. The
15 first category being people who definitely
16 worked in those buildings, and that would be
17 from that latter dosimetry code area 5A and
18 5C, 5A being 773, 5C being the TNX, CMX Area.

19 The second category is people who
20 may have been exposed to thorium. And that
21 would include the people in the surrounding

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1 buildings around 773A that could have gone
2 into there. They were part of the Technical
3 Division. They could have worked in there
4 excluding the managers and including the
5 construction trades workers who also could
6 have gone up there and worked and been exposed
7 to thorium for an extended period of time.
8 Those are all people we considered may have
9 been exposed to thorium and we feel they
10 should be included in the Class.

11 The third category is people who I
12 consider not having a potential for internal
13 exposure to thorium, and that would be all the
14 reactors in the D Area due to how those
15 materials were handled.

16 Please keep in mind that the 300
17 Area there was definitely potential for
18 internal exposure to thorium, however we feel
19 the uranium bioassay method that we proposed
20 in Addendum 1 and the air sample in Report 46
21 would enable us to estimate the doses for

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1 those people who worked in that 3A dosimeter
2 designation.

3 And that basically leaves then the
4 200 Area which I believe you're going to be
5 looking at and providing us some comments more
6 on. At this time we feel that the 300 Area
7 can be for the -- doses that we've got we've
8 estimated from the 300 Area would bound the
9 minimal exposures to the 200 Area during that
10 transfer of thorium from that hold-up tank
11 into those railroad cars.

12 And this is how we came up with
13 this Class Definition. And I'll pause there
14 for questions or clarifications, comments,
15 whatever.

16 CHAIRMAN GRIFFON: Yes, Tim, this
17 is Mark. And those tables are useful
18 summaries of your approach.

19 One question, I mean it looks --
20 well, a couple of questions, but I'll start
21 with one on the process side, and I may have

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1 missed this. You may have said this earlier
2 in your discussion. But 777M, I'm looking in
3 your table areas that you determined
4 unencapsulated thorium existed and yet you're
5 not proposing to include in the SEC. One of
6 them, obviously, is 300M you just talked
7 about. But the 777M can you give me a little
8 background on that and why the rationale for
9 not including that? It's probably in your
10 footnote, but I'm talking as I'm reading some
11 of this.

12 DR. TAULBEE: Yes. The main
13 reason here is this is where there was a
14 series of critical piles where they would do
15 reactivity measurements on thorium slugs.
16 Most of the thorium that was over there in
17 that area was encapsulated. However, not all
18 of it. Some of it was bare thorium slug,
19 however they weren't doing anything with them
20 other than loading them into a critical pile,
21 taking reactivity measurements and unloading

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1 them. They weren't doing grinding, glazing,
2 cutting, welding; anything else with these in
3 that area. So this is mostly handling
4 encapsulated thorium, but there were a few
5 times where we've seen some bare thorium
6 measurements that they were doing. They're
7 doing reactivity measurements, taking it up to
8 critical for a short period of time, not an
9 extended, high-flux, this is just to measure
10 the reactivity of the cross-sections of what
11 was happening with the different slug or the
12 different fuel geometry, assemblies; that type
13 of thing.

14 So that was what they were doing
15 in this area. And so we feel that the 300
16 Area M, the 300M Area, which is this just to
17 the east end of that particular area if you
18 look at it on a map where it's located, we
19 feel that these people would be bounded by
20 those uranium exposures from that M Area.

21 CHAIRMAN GRIFFON: Okay. And then

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1 I'll start into the one obvious area I think
2 that some of us have on our mind, which is you
3 know I think we've stumbled down this path
4 several times where we've tried to parse out
5 buildings. And I think, you know we all get a
6 little nervous when we -- and I'm sure you
7 guys also, that you are concerned about from
8 the implementation side when Labor tries to
9 implement this. And I know you've talked to
10 them a little bit. But I mean the question of
11 did the workers go back and forth between
12 buildings. And I appreciate your approach
13 with the central shops. That's a good thing I
14 think. And the A area, some of those things
15 are taking that into account.

16 There's one thing in this, not
17 intended to be a sort of -- I mean, the last
18 meeting and when I was reading this and
19 thinking of the 300M Area and some of the
20 approach you were using from that, I went back
21 to the transcript from the last meeting.

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1 Because I remembered this, but I just wanted
2 to refresh my memory.

3 And, you know when we talked about
4 those bioassay measurements, the logsheets, I
5 guess. Anyway, I can find the excerpt from the
6 transcript from last time. But it was
7 basically you were saying that they -- I think
8 Joyce pointed out that all these workers that
9 you're using for the M Area were actually --
10 in their column of where they worked it said
11 773, Building 773. And then you said, yes,
12 but based on some of them also indicated M
13 Area, and in fact we heard through interviews
14 that people were moving back and forth between
15 the two areas.

16 So I guess 300M Area jumps out at
17 me as one that it seems like in the past, at
18 least, that you've concluded through
19 interviews and other information that that
20 these people were in fact moving between these
21 areas. So I think that might be a problem in

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1 terms of just which workers belong in this
2 Class Definition.

3 DR. TAULBEE: Yes. Let me clarify
4 a little bit. You know, our information at
5 that time was that it was only small
6 quantities of thorium being worked with in
7 773A. So in an effort to try and explain why
8 all these bioassays for 773A and none for M
9 Area, we were drawing a conclusion,
10 incorrectly because the inventory reports have
11 shown us clearly that there was significant
12 material in 773A now, that there was movement
13 between the two buildings.

14 Now the interviews you're talking
15 about, absolutely they did indicate that they
16 would go between the buildings, however the
17 people who we were talking to were the
18 engineers and researchers type of scenario.
19 The regular production workers we don't
20 believe that they were moving back and forth
21 as being described here because they were in

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1 different divisions, from what I can see at
2 this time. This changes from what I had said
3 back in January, yes.

4 CHAIRMAN GRIFFON: Okay. I mean,
5 I'm just looking at potential pitfalls on
6 going forward that we're going to have people
7 claiming that they were in that area all the
8 time. I mean, we've been through this play
9 before, you know.

10 DR. TAULBEE: Yes.

11 CHAIRMAN GRIFFON: And, I mean and
12 those engineers if they worked there 20, 25
13 years over that course of time, could they
14 have been in the 773 Area, you know could they
15 have been in one of the areas that you're
16 designating for more than the 250? I mean,
17 how do you sort of make a judgment call on
18 that, I guess?

19 DR. TAULBEE: Well, from what we
20 can tell the engineers and so forth were
21 actually badged out of the 5A dosimeter code

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1 out of 773A.

2 CHAIRMAN GRIFFON: Oh, okay. So
3 they would have been included?

4 DR. TAULBEE: That's correct. So,
5 yes, they should have been included from that,
6 or should be included. And as far as the
7 buildings in the Class Definition of doing
8 this, this is why the Class Definition is
9 written the way it is. There's no indication
10 of building written in there. It is only time
11 period and the dosimeter codes. And that is
12 because there are -- the front section of 773A
13 is all administrative offices. So there could
14 be secretaries who worked in that front part
15 of that office, in order to go to the back
16 area to go into the regulated area, they had
17 to pick up a dosimeter badge. And there were
18 visitor badges there. And when they picked
19 one up and they file a claim, we see that
20 visitor dosimeter badge. So if they went back
21 there into those areas, then we would see a

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1 dosimeter badge from that standpoint. So this
2 is why we've written the Definition the way --

3 CHAIRMAN GRIFFON: And what if
4 they had a visitor dosimeter badge? Then do
5 you try to parse it out to say well they were
6 an administrative worker that went back there,
7 but it was only a visitor badge so they
8 probably weren't there more than a few days?

9 DR. TAULBEE: I wouldn't do that,
10 but I don't know how Department of Labor is
11 going to do this.

12 CHAIRMAN GRIFFON: Okay. I mean,
13 these are the problems sometimes we get into
14 with this. I mean, I think overall you lay
15 out a reasonable argument for this,
16 notwithstanding other questions that we have
17 still on the 300M area and your approach that
18 you're using there and some other areas that
19 Arjun has raised as where you may have
20 concluded that there wasn't any significant
21 chance of internal exposure. But SC&A may --

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1 you know. We still have those issues on the
2 table, but for these particular areas or for
3 this Class that you're proposing to add, you
4 make a reasonable argument, I think, at least
5 from my opinion. I just worry about these
6 folks coming forward and having to -- you
7 know, then you get into a situation of an
8 individual having to fight Department of Labor
9 to say "But I was in there all the time. What
10 do you want? I can get supervisors to give
11 affidavits that say that I was in there." I
12 mean, I worry about going down that path is my
13 point.

14 DR. MAKHIJANI: This is Arjun.

15 I have a question about the badge
16 designations. What were the badge
17 designations of the construction workers who
18 were not DuPont employees; subcontractors and
19 subcontractors of subcontractors? Because we
20 have very clear sort of interview information
21 that, you know, they went wherever they were

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1 asked and they did similar jobs to production
2 workers sometimes, and then they did
3 construction worker jobs, you know,
4 maintenance jobs, new buildings, new
5 facilities, you know, the works.

6 Did they have the same badge
7 designations as DuPont workers? I'm not
8 including DuPont maintenance workers now. I'm
9 just talking about construction workers who
10 were not DuPont employees.

11 DR. TAULBEE: It is our
12 understanding that they would have been
13 badged, now it would depend upon where they
14 first reported. If they were reporting down
15 to, say, the carpenter shop in the central
16 shops area and then going out with a crew from
17 there, then they would have been badged down
18 there from the central shops.

19 (Simultaneous speaking.)

20 DR. MAKHIJANI: -- that that's
21 what happened?

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1 DR. TAULBEE: I'm sorry?

2 DR. MAKHIJANI: Now this is from
3 memory, Tim, because I haven't looked at these
4 interviews in a while. But I think that's
5 what they said happened, and of course apart
6 from the question that they've said that they
7 were often working when they didn't have
8 badges. But leaving that aside for the
9 moment, I think non-DuPont construction
10 workers -- I mean, I just don't know whether
11 they would fall into these badging categories
12 and whether your SEC would capture them.

13 DR. TAULBEE: Well, I believe the
14 SEC would capture them because they would go
15 through one of two paths. Either they would
16 go down to the central shops and be badged
17 from the central shops area or they would be
18 badged up there in the 700 Area. In the
19 latter years there's a particular badge
20 designation for -- called the construction
21 gate where they would be badged from. So one

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1 of those six series, 6B through 6D would
2 capture them under that particular
3 designation. So when they went into the 700
4 Area and then down in the TNX Area. These
5 workers would be badged as visitors, but again
6 whenever they would file a claim with us,
7 Savannah River sends their dosimetry to us, we
8 can look through their dosimetry codes and we
9 can see where it is that they worked.

10 DR. MAKHIJANI: And so the claim
11 is basically that there are no generic
12 visitors' badges. That visitors' badges are
13 assigned to particular workers consistently
14 and not to any other workers so that you could
15 actually track when a construction worker went
16 into the 773 Area that they always wore the
17 same badge?

18 DR. TAULBEE: It is our
19 understanding that for a continuous project
20 they would have. However, if once that
21 project was finished and they went to, say,

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1 the R reactor, they would get a different
2 visitor badge issued out of the R reactor.
3 And so it would have the R reactor
4 designation. Their name would be associated
5 within a badge in the 700 area and a badge in
6 the R area.

7 DR. MAKHIJANI: Besides their own
8 badge, so they -- did they not have a badge
9 that they continuously wore themselves?

10 DR. TAULBEE: That's correct, they
11 did not have a badge that they continuously
12 wore themselves unless they were going to be
13 doing an extended project in that area. And
14 then we do see a lot of construction trades
15 workers that are monitored for a period of a
16 few months, and then they drop off. And when
17 you look at the dosimetry logs, the largest
18 group of people that are on determination work
19 are construction trades workers that are
20 moving in and out of different areas.

21 DR. MAKHIJANI: Yes. I'm a little

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1 -- I'm actually more confused now than I was
2 before. So are you saying that there were
3 many construction workers on site who were not
4 badged unless they were assigned to particular
5 areas of work?

6 DR. TAULBEE: I'm not sure what
7 you're asking there.

8 DR. MAKHIJANI: Well, if they were
9 only wearing visitor badges, they went into
10 700 or 300 or 100 and then they got a badge of
11 that area that had their name on it and that
12 would be in their file, then presumably they
13 didn't have any badges when they were not
14 assigned to a particular area?

15 CHAIRMAN GRIFFON: Perhaps I can
16 try. This is Mark Griffon. If I'm
17 understanding Tim correctly you're saying they
18 would be assigned "visitor badges," but they'd
19 be area-specific visitor badges, Tim?

20 DR. TAULBEE: That is correct.

21 CHAIRMAN GRIFFON: Yes.

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1 DR. MAKHIJANI: As a person-
2 specific? So not just area-specific --

3 CHAIRMAN GRIFFON: Right. They
4 hold onto that badge while they're working on
5 that project in that area. But then if they
6 went to another area, they would turn in that
7 badge and get another badge from the other
8 area.

9 DR. MAKHIJANI: I'm not
10 understanding. What happened to that badge?
11 Did somebody else wear it after -- before it
12 was read?

13 CHAIRMAN GRIFFON: I'm assuming it
14 was read. Yes, I don't know that. Yes.
15 That's a good question.

16 DR. TAULBEE: Yes, it would be
17 read. It would be read with that particular
18 person and then basically -- you know, that
19 one person that say he wore this badge for a
20 week in R area, that badge would then be read.
21 He then went to, say, 700 area, he was issued

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1 a different badge --

2 CHAIRMAN GRIFFON: Yes.

3 DR. TAULBEE: -- and he wore that
4 for, say, two weeks, and that badge would be
5 read.

6 DR. MAKHIJANI: Yes. And in
7 between assignments to these areas they had no
8 badge?

9 DR. TAULBEE: If they were not in
10 the area that was regulated or a radioactive
11 material area, that's correct. They would not
12 have a badge.

13 DR. MAKHIJANI: Okay. Because a
14 lot of them have said that they were in
15 radioactive areas that were not properly
16 marked. And so essentially you're confirming
17 something that they've said, I just wanted to
18 clarify that.

19 And so I presume that you've
20 tracked this kind of visitor badge issue
21 because it's obviously going to be a very

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1 central issue, especially for non-DuPont
2 employees because you know a good level of
3 confidence that they had individual badges
4 that were designated as visitor badges that
5 also carried the name of the person
6 consistently and were read consistently that
7 way. I mean, I presume you've researched and
8 documented that.

9 DR. TAULBEE: Yes. Within the
10 dosimetry logs or dosimetry records there are
11 visitor logs as well. And this is almost -- I
12 wouldn't say exclusively, but the vast
13 majority of the entries of people in those
14 visitor logs are construction trades workers.

15 And when everybody had their badge and --
16 continuing on this R 700 Area example, they
17 would have an individual card and it would say
18 that this person was monitored for this week
19 and in there, and here's the dose. And then
20 the next line would be the person was
21 monitored for -- well, externally monitored in

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1 the 700 Area for this week and it would have
2 that dose.

3 So these individual cards are
4 filed by alphabetical name, comprise multiple
5 dosimeter badges for an individuals who was a
6 nonstandard DuPont worker who had a payroll
7 ID.

8 DR. MAKHIJANI: And this kind of
9 thing extends to the film badge before --
10 we're talking mainly before the TLD era,
11 right?

12 DR. TAULBEE: That's correct. Yes.

13 DR. MAKHIJANI: So you're talking
14 about somebody goes for two days, does a job,
15 has a film badge, and it will be read. And
16 then, of course, it's over for that film
17 badge, right?

18 DR. TAULBEE: That's correct, yes.

19 DR. MAKHIJANI: And that there is
20 a kind of -- that all of the construction
21 workers -- so there's another kind of

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1 question. Did the construction workers always
2 just use visitor badges? Weren't there
3 construction workers who were there on site
4 for years together who were not DuPont
5 employees who had their own badges, and what
6 were their badge designations?

7 DR. TAULBEE: That is -- well,
8 yes. The construction -- there's two
9 different parts here. One for -- within the
10 dosimetry logs is construction trade workers,
11 okay? Not all of them were DuPont employees
12 because they have payroll ID numbers that are
13 very large. And depending upon the trade
14 number it kind of goes sequentially but it
15 jumps up to like 90,000 -- not all of them are
16 DuPont employees. Many of the DuPont
17 employees were actually under roll two; these
18 were mechanics, maintenance type of people.
19 They were all under what was called the Local
20 Wage Roll. Construction was different wage
21 roll.

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1 And so -- was going to be there
2 for an extended period of time, got their own
3 badge designation. And these would be out of
4 that 12 series that you're looking at, and
5 they could go anywhere with that single badge,
6 which is why we've included them in the SEC.

7 So the roll four is not just
8 DuPont, it also includes some of these other
9 construction trades workers. What I've been
10 talking about with the visitor ones is people
11 who only worked at the site for, you know, a
12 maybe one to two year period and worked
13 between multiple areas. Those were the ones
14 who they probably did not issue an individual
15 badge to and assign an individual number to.
16 But we do have the dosimetry when they file a
17 claim we can get their dosimetry back and look
18 at which areas they worked in.

19 DR. MAKHIJANI: Probably?

20 DR. TAULBEE: I'm sorry?

21 DR. MAKHIJANI: Probably?

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1 DR. TAULBEE: What do you mean by

2 B-

3 DR. MAKHIJANI: Yes, it's just a
4 question. I mean, if they worked for one to
5 two years, they probably didn't have a badge
6 but maybe they did and we're not sure or was
7 there a time limit like three years? If they
8 worked for three years, they had their own
9 badge? And if they did, if they were non-
10 DuPont -- so I'm a little puzzled because I
11 mean we've got a bunch of interviews with
12 workers that said that, you know, they could
13 have been there for a few months and there
14 were people who came for a few months and then
15 they were laid off, and they were brought back
16 and there was construction union hall hiring
17 and all that. And then there were
18 construction workers who were on-site for
19 years who were not DuPont employees and many
20 of them later became DuPont employees, as you
21 know. And I'm talking about those

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1 construction workers who were there on site
2 for prolonged periods whether they had their
3 own badges and what those badge designations
4 were and whether you've captured them.

5 DR. TAULBEE: If they were on-site
6 for prolonged periods, then they were given a
7 unique identifying number. And, yes, we have
8 their dosimetry data, their log -- they are in
9 those dosimetry logs, okay?

10 DR. MAKHIJANI: No, no. Whether
11 you've captured them in your SEC --

12 DR. TAULBEE: Yes --

13 DR. MAKHIJANI: -- these badge
14 designations?

15 DR. TAULBEE: -- they would have
16 been badged out of that 12 series. Almost all
17 of the construction trades workers are badged
18 out of that 12 series.

19 DR. MAKHIJANI: Okay. Including
20 non-DuPont employees?

21 DR. TAULBEE: Yes.

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1 DR. MAKHIJANI: Okay.

2 MR. MAHAFFEY: Tim, Mark Mahaffey.

3 We have hundreds of records of
4 visitors, call ups and non-DuPont construction
5 workers with badges as short as one day and
6 over multiple months, and also bioassay data.

7 And, you know, the HP techs we interviewed
8 said that no one went into the rad controlled
9 area without a film badge.

10 DR. MAKHIJANI: Oh, yes. I'm not
11 talking about whether they went without a film
12 badge or not because we're parsing this by
13 film badge designations and not whether they
14 were badged or not. I mean, if the SEC were --
15 you know all workers who were badged, that
16 would be a different argument.

17 MEMBER CLAWSON: Tim?

18 DR. TAULBEE: Yes.

19 MEMBER CLAWSON: This is Brad
20 speaking.

21 I hope you understand. I mean,

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1 you've talked several times on this. Savannah
2 River is a very unique site from the
3 standpoint of the operations personnel being
4 DuPont employees plus a large majority of the
5 contractors being DuPont employees. Then we
6 switch over to the subcontractors of
7 subcontractors being classified as
8 construction trades, too. And this is kind of
9 where I know where Arjun is going because me
10 and him have looked into many of these things
11 and heard many of these interviews as well; at
12 one time I was a DuPont employee and then I
13 wasn't. I was working for Rust, or somebody
14 like this, and so forth. That's kind of where
15 our worry comes into this.

16 You know as well as I do the
17 uniqueness of Savannah River. And when we
18 talked to especially the construction trades,
19 I understand what you're saying if they're in
20 the central shops and stuff, if they weren't--
21 hadn't been there for several years, or

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1 whatever, part of the pool to say then they
2 didn't have a film badge. And when they went
3 out to different sites, like the R or any of
4 the other areas, then they would get a new
5 film badge.

6 And I was surprised but I was also
7 delighted to hear that when they went out,
8 that these film badges were reading and that
9 you've actually found where at one week they
10 were at this place and they were one week at
11 the other place. Because this was one of the
12 questions of, you know, did they just take
13 this film badge and go from one site to the
14 other or did they have designators in it. And
15 a lot of times they couldn't tell us that they
16 did or they didn't. And this is why it was
17 good to see that you'd found this in the
18 radiological reports and so forth, which I'm
19 sure that Arjun's going to look into it and
20 stuff like that.

21 But I want you to understand we're

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1 not criticizing what you've done or we're not
2 trying to nitpick at it. The thing is that
3 from my standpoint is it seems like we've been
4 down this road again. And we just want to
5 make sure that we have our questions answered
6 to make sure that we've covered all of our
7 bases. And as Mark said earlier, we just got
8 this the other day so there might be a lot of
9 questions that you have that you can answer
10 for us and it'll give us a better, easy
11 feeling on it. Because, you know, it's
12 looking pretty good.

13 I just want you to understand when
14 we say these things, it isn't criticizing the
15 work that you've done and stuff like that.
16 Actually, my personal opinion is that you've
17 done a very good job. We just want to make
18 sure that we're implementing it in the right
19 way. Because with Savannah River, especially
20 the construction trades, it's a whole
21 different ball game than any other site. It's

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1 unique in its own way. And I just want you to
2 understand that.

3 DR. TAULBEE: Thank you very much
4 for that, Brad.

5 CHAIRMAN GRIFFON: Tim, this is
6 Mark Griffon. I think at this point, I mean I
7 just wanted to think path forward. And I
8 agree with Brad=s sentiments.

9 You know, at least my feeling is I
10 appreciate the intent of this Class being
11 added. There still might be some questions
12 about, you know, trying to do it this way as
13 opposed to the all worker approach, which we
14 often end up at.

15 But I think what I'd like to do is
16 there is time on the agenda in the upcoming
17 Board meeting at the end of August here at
18 Hanford for Savannah River. I think it even
19 says, Tim, you were going to present, and I
20 think I had a little time, or whatever.

21 I don't know that today we

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1 necessarily have to come up with a Work Group
2 motion to bring to the Board. What I'd rather
3 propose is that, you know, well Tim will
4 summarize, but I can also say that from our
5 standpoint we heard this and, you know, that -
6 - just sort of outline what the Work Group's
7 still doing. And my intent right now would be
8 to present that I support the addition of this
9 Class, but that we have some remaining
10 questions about the who part of the Class,
11 whether NIOSH can adequately identify these
12 workers for the reasons we've just discussed
13 for a while. And then, you know offer it for
14 discussion to the full Board.

15 And maybe the other thing I would
16 ask is that we -- I don't know if this
17 document has been offered; if it's on the
18 website and/or if it's been sent to the
19 petitioners. Because I think they might be
20 able to comment during that time period on
21 these very issues whether they believe, you

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1 know, on the badging questions and things like
2 that. We might get some useful public
3 comments that would be helpful to sort out
4 this question.

5 So that would be my proposal right
6 now is to sort of bring this back in to
7 Hanford. And then if the Board, if everyone
8 sort of feels comfortable at a certain point,
9 we might want to make a motion during the
10 Board meeting to add the two, accept this
11 Class Definition and add the Class. But I
12 don't know that we have to have a Work Group
13 motion today.

14 How do other -- Brad or Jim, how
15 do you feel about that?

16 MEMBER LOCKEY: I agree with you
17 on this, Mark.

18 I'm going to be right honest.
19 Part of my apprehension is having tried to
20 single this out, and Tim has done a very good
21 job of expressing why he feels that this would

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1 be the best and so forth, I would just like a
2 little bit of time to be able to look at it.
3 The way it looks, it looks good to me at this
4 time. And I think that we could do something
5 at the Board and go from there. But also--

6 CHAIRMAN GRIFFON: And the other--

7 MEMBER LOCKEY: -- time to look at
8 it.

9 CHAIRMAN GRIFFON: And this is
10 Mark again.

11 The other thing I plan to say in
12 my portion of the presentation is that -- and
13 this is just with regards to thorium. I hope
14 that after we finish this discussion in a few
15 minutes, Tim will update us on other areas
16 that the Work Group is still working on.

17 But that, you know, we're not --
18 the SC&A and the Work Group are certainly,
19 even if we support and make a motion to add
20 this Class, it doesn't mean that we support
21 everything in Addendum 2. We have some

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1 questions about other areas, and we have to
2 research those further. You know, this is new
3 to all of us so we want to still consider,
4 like, 300M Area and the other model that's out
5 there and those issues. So I'll also bring
6 that up.

7 But I think that probably is the
8 best thing to do now would be just to bring
9 this issue back to the Board and discuss it
10 there.

11 Jim, do you have any thoughts on
12 that?

13 MEMBER LOCKEY: Yes. I agree with
14 that. I'd like some additional time to look at
15 the report I got yesterday.

16 CHAIRMAN GRIFFON: Right.

17 MEMBER LOCKEY: And so I agree. I
18 concur with what you're both saying.

19 CHAIRMAN GRIFFON: Okay, and I
20 don't know -- Arjun, I think as far as -- I
21 don't think we have to get a separate tasking,

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1 but I would think by the nature of SC&A being
2 tasked in the Work Group that I would ask that
3 you continue working on looking at this
4 report, also SC&A look at this report and
5 certainly compare it to your last thorium
6 report and continue on those issues,
7 especially with regard to other areas where
8 you believe -- and the question of the 300M
9 area, the current model that's out there, et
10 cetera. I think that's still a task for SC&A.

11 Is that -- do you agree with that? Arjun?

12 DR. MAKHIJANI: Am I off mute?

13 CHAIRMAN GRIFFON: Oh, you're on
14 now, yes.

15 DR. MAKHIJANI: Sorry. I didn't
16 remember I was on mute.

17 Yes, the two reports that we wrote
18 covered the period up to 1972, which is the
19 same period now or '71 something, that this ER
20 Addendum 2 covers. So maybe for the moment we
21 would restrict ourselves to that.

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1 As you know I sent a note to the
2 Work Group and to Tim when he sent an email
3 around about the period after 1972, which
4 they're researching, which we had a fair
5 amount of information about that too. What
6 I'll do for the moment until the Board meeting
7 is to look at this in some more detail.
8 Obviously, there are a lot of comparisons to
9 be done to see whether we want to revise
10 anything we said before or modify it, or stand
11 by it, or -- you know. I have to consult with
12 Joyce, obviously.

13 CHAIRMAN GRIFFON: Sure. Sure.
14 That's fine.

15 And you know I would expect that
16 you could -- I mean some of these issues are
17 for review not necessarily for the upcoming
18 Board meeting but for the next Work Group
19 meeting after the Board meeting. You know,
20 sometime in the future. But at least you'll,
21 hopefully, have a little time to look a little

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1 more at this report before the Board meeting
2 also so that during our presentation if we
3 need to call on you, I'm sure you'll be ready
4 to help us out.

5 DR. MAKHIJANI: Yes. I'll
6 certainly be more ready then I am today having
7 glanced at this --

8 CHAIRMAN GRIFFON: I think we can
9 all say that. Yes, yes.

10 DR. MAKHIJANI: But what I propose
11 for the longer -- until the next Work Group
12 meeting for this particular topic is maybe we
13 can make a table that shows the various
14 positions with comments, or write a memorandum
15 or something like that. I mean, I can send you
16 an email about what format I think might work
17 best without going into another long drawn out
18 report.

19 CHAIRMAN GRIFFON: Yes. That
20 sounds good. Yes. Okay. All right.

21 And, Tim, if there's nothing more

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1 on thorium, do you have anything else to add?

2 Otherwise, I would just ask you -- and I
3 understand based on our earlier discussions
4 that this has taken a lot of your team's
5 efforts in the last several months. And
6 that's why I didn't want to go through the
7 entire matrix at this meeting today. But I
8 thought if there's any -- you know, some of
9 the main actions you might just give us a
10 little update on other actions that are
11 proceeding, other coworker models. You know,
12 the exotic radionuclides, some of that stuff,
13 whether it's -- you know, just give us maybe a
14 little status report on some of those issues
15 if you can today. That would be great.

16 DR. TAULBEE: Sure. Before I do
17 that, though, I do appreciate you recognizing
18 that the team has been working very hard on
19 this, and so we haven't made a tremendous
20 amount of progress on the other issues. They
21 are still going on kind of in the background.

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1 But, again, the team Mike Mahaffey is the
2 ORAU lead on this site for us. And pulling
3 this report together in this relatively short
4 time period has taken a tremendous effort.
5 And I really thank Mike for doing that and
6 pulling this together pretty quickly.

7 With regard to the other issues,
8 the main one that has been worked on is the
9 exotic radionuclides, the coworker model
10 associated with that. We had gone back, and
11 I'm not sure if I reported this during the May
12 or the February Board meetings, but we had
13 coded or began coding all of the americium
14 data, americium, curium and californium data
15 from the logbooks, and that effort has been
16 completed. And so the data is being cleaned
17 up at this time and being checked and
18 verified. And at that point we will begin the
19 coworker model development. And this is a
20 case where we are comparing the construction
21 trades workers to non-construction trades

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1 workers. And we've developed the methodology
2 to do this.

3 As you might be aware, this is a
4 rather difficult task compared to the tritium
5 in that there's significant missed dose -- or
6 not missed dose, a below-detection result
7 associated with these particular radionuclides
8 because of the way they were handled in glove
9 boxes and fume hoods and so forth. So we have
10 a lot of data and a lot of it is below-
11 detection limit. So we have developed methods
12 on how to do that, and therefore doing a
13 stratification comparison and the methodology
14 is developed, not just for Savannah River but
15 kind of complex-wide. Fernald, for example,
16 is another one where we might use this
17 particular type of methodology.

18 So we've ended up making progress
19 on that. The data, like I said, has been coded
20 and so we're getting ready to start that
21 particular analysis.

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1 CHAIRMAN GRIFFON: Tim, you said
2 that was for americium and californium?

3 DR. TAULBEE: Americium, curium,
4 californium.

5 CHAIRMAN GRIFFON: Curium and
6 californium? Okay.

7 DR. TAULBEE: And so, like I said,
8 that effort is going to be first. These are
9 actually coming in serial. There's some here
10 we can work in parallel, we have been. But
11 due to resource limitations when it gets down
12 to the actual analysis part they do go in
13 series. So this is where we're at with this
14 one, the exotic --

15 CHAIRMAN GRIFFON: Do you have any
16 idea on timing on this? As you're giving
17 updates if you have any ideas on times?

18 DR. TAULBEE: Yes. Let me see.
19 Give me just a second here to pull up our
20 project plan of when we expect that this would
21 be completed. It looks like the first draft

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1 to us is going to be -- sorry. It looks like
2 it's in November is when we will get the first
3 draft of this. So I don't think it would be
4 available by the December Board meeting, but
5 shortly thereafter the final approved coworker
6 model comparing construction trades workers to
7 non-construction trade workers should be
8 available.

9 CHAIRMAN GRIFFON: Okay.

10 DR. TAULBEE: Okay. And the next
11 one is neptunium, and then after that we'll go
12 on to the next fission products and then the
13 cobalt-60.

14 CHAIRMAN GRIFFON: Am I still on?

15 DR. TAULBEE: Yes, you are.

16 CHAIRMAN GRIFFON: Yes, I get
17 confused with the *6.

18 Is there any sense, Tim, of --
19 because I'm just thinking here, you know, in
20 terms of prioritizing. Assuming we accept the
21 Class for these thorium areas anyway, a Class

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1 related to thorium work, then that goes from
2 '52 to '73, am I right on the dates there?

3 I guess my question would be is
4 there anyway that if the -- for instance, I'm
5 just giving an example, if the curium work was
6 also in one of the areas covered by this SEC
7 and the workers, the external monitored
8 people, it would have been the same folks,
9 then we might be able to de-prioritize those
10 because they would already have been added to
11 the SEC. Do you understand what I'm saying?
12 Is there any way that you can look at that and
13 prioritize, you know, assuming we add this
14 Class?

15 DR. TAULBEE: Yes and no.

16 CHAIRMAN GRIFFON: I knew that
17 would be a clean answer.

18 DR. TAULBEE: Yes, clearly most --
19 the bulk of the americium, curium, californium
20 work was done in 773A. So up through 1972,
21 yes, that would be something that could, I

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1 guess, be de-prioritized within that time
2 period.

3 But really at that point it
4 doesn't really buy us a whole lot. The time
5 periods for this particular work that we're
6 looking at really goes up into -- I think the
7 dates here are 1963 through 1989. So post-'72
8 there's still a significant fraction of work
9 that's going on in those labs dealing with
10 americium, curium, californium. So the
11 addition of the '63 to '72 time period, once
12 the data=s been coded, which is really the
13 longest time period. And we are -- there are
14 two parts to this.

15 The first part is coding the
16 bioassay data. The second part is going
17 through the work history cards to identify
18 what that person's job title was when they
19 left that bioassay sample. That latter part
20 is what is taking the bulk of the time.

21 CHAIRMAN GRIFFON: Understood.

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1 DR. TAULBEE: So once we get past
2 that step the actual analysis goes fairly
3 quickly. There's a lot of internal review
4 that has to be done to check numbers, but the
5 bulk of the time period is actually -- I
6 wouldn't say -- it's post '72, '63 to '89
7 covers a very large time period.

8 CHAIRMAN GRIFFON: Yes.

9 DR. TAULBEE: So it's really not
10 adding that much work. So I guess --

11 CHAIRMAN GRIFFON: Okay. And I
12 would just say you don't have to give me
13 necessarily the details on each one of these,
14 but as you're doing your project planning, I'm
15 sure you probably already thought of this, but
16 you know if some of the ones are cleaner, in
17 other words they are totally encapsulated by
18 that SEC time frame, maybe put those at the
19 end of your work to do, or whatever. If
20 there's any way to be more efficient with our
21 process, then keep that in mind, I guess is

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1 what I would say.

2 DR. TAULBEE: Okay.

3 CHAIRMAN GRIFFON: Yes.

4 DR. TAULBEE: Just to follow-on to
5 that, I'm going to look at the cobalt-60
6 dates, but I think the cobalt-60 might be
7 completely encompassed by this Class. So I'll
8 look at that.

9 CHAIRMAN GRIFFON: Okay.

10 DR. TAULBEE: And the other one,
11 polonium, which I think SC&A has a task right
12 now, that would be completely encompassed by
13 this Class. So that might be one that you
14 might want to de-prioritize as well.

15 CHAIRMAN GRIFFON: That's what I'm
16 looking for. Okay. Thank you.

17 DR. MAKHIJANI: May I ask a
18 question, Mark?

19 CHAIRMAN GRIFFON: Sure, yes.

20 DR. MAKHIJANI: The exotics, I
21 only heard Tim mention the californium,

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1 americium. Actually, I think we kind of
2 decided -- this memory may not be serving me
3 well, but that we were going to restrict the
4 term "exotics" to other radionuclides than
5 these specific ones and neptunium that are
6 called out in the matrix. I mean, we've been
7 using the term in different ways in different
8 SECs. But there are a whole bunch of other
9 radionuclides under exotics, and I'm wondering
10 whether --

11 CHAIRMAN GRIFFON: Yes. I think
12 your memory is correct that we decided to--

13 DR. MAKHIJANI: -- which is a
14 separate category. And we've written a report
15 about that. And, you know there's a table
16 with what they are. I mean, I guess we agree
17 there may not be 150, but you know there are
18 dozens of them.

19 CHAIRMAN GRIFFON: Yes, right.
20 And I think that's right. We did -- the ones
21 we called out -- I think we've been saving

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1 that longer list for it to be called
2 "exotics," and these other ones we specified.

3 I think you're right. So we should try to
4 stick to that when we're discussing it, I
5 guess, yes.

6 DR. MAKHIJANI: Yes. I was just
7 wondering about the status of what we have
8 been calling exotics before.

9 CHAIRMAN GRIFFON: Right. Yes.

10 Go ahead, Tim, do you have
11 anything on that, other --

12 DR. TAULBEE: Yes. We do have a
13 report that is under development to address
14 these other exotics, if you will. In fact,
15 I'll try and limit exotics to this other
16 category, and this is responding to Arjun's
17 report. We do have a report that's in draft
18 and undergoing review currently. And it looks
19 like the timeline for this one would be,
20 again, the end of October first of November
21 that we would be providing that to the Work

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1 Group here.

2 One of the things that just struck
3 me as I was talking about this one is that
4 that would be another area where we could
5 possibly eliminate some of these exotics if a
6 Class were designated. Because a lot of this
7 research took place in the 1960s in the 773A
8 laboratory. So --

9 CHAIRMAN GRIFFON: Okay.

10 DR. TAULBEE: So some of these
11 might go away -- or not go away, but from an
12 issues standpoint here.

13 CHAIRMAN GRIFFON: Yes. All
14 right.

15 And then, I'm sorry, I might have
16 sidetracked your process there, but I think of
17 the ones that were listed, I didn't hear
18 neptunium. Did you report on that?

19 DR. TAULBEE: Neptunium is one
20 that we will follow right after the americium,
21 curium, californium. That's next in line.

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1 CHAIRMAN GRIFFON: Okay. All
2 right.

3 DR. TAULBEE: Then we will move to
4 the mixed fission products, and again I got to
5 look at the cobalt-60 and see if that time
6 period is already encompassed by this proposed
7 SEC.

8 CHAIRMAN GRIFFON: And what about
9 neptunium timeline, where is that solved, do
10 you know offhand?

11 DR. TAULBEE: The neptunium
12 actually continues on into the latter time
13 periods.

14 CHAIRMAN GRIFFON: Okay. All
15 right.

16 DR. MAKHIJANI: Mark, this is
17 Arjun.

18 So far as SC&A is concerned, give
19 me a little direction. For the moment I'll
20 just focus on thorium and we have some -- a
21 couple of to-do items that are in other areas

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1 --

2 CHAIRMAN GRIFFON: Tim just
3 mentioned polonium was something that you were
4 tasked with.

5 DR. MAKHIJANI: Yes. I was
6 thinking it might be better to wait --

7 CHAIRMAN GRIFFON: Yes.

8 DR. MAKHIJANI: -- until this
9 matter is clarified --

10 CHAIRMAN GRIFFON: Yes. If this is
11 going to be covered, it may not be a priority,
12 right.

13 DR. MAKHIJANI: I think polonium
14 and tritium are responding to NIOSH's tritium
15 report.

16 CHAIRMAN GRIFFON: Right.

17 DR. MAKHIJANI: I think sort of we
18 were talking past each other a little bit in
19 that tritium report. But I've been kind of --
20 knowing that this was coming, I kind of
21 thought that we shouldn't be wasting effort

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1 and to see what the outcome of this particular
2 revision was going to be. So I'm looking for
3 a little direction here as to whether you want
4 me to focus on any other thing or just thorium
5 for the moment?

6 CHAIRMAN GRIFFON: I think just
7 thorium for the moment.

8 DR. MAKHIJANI: Okay.

9 CHAIRMAN GRIFFON: Yes.

10 Tim, any other updates of
11 significance? You don't have to go through the
12 whole -- every matrix item, you know.

13 DR. TAULBEE: Again, just as
14 priority issues, the americium, curium,
15 californium, followed by neptunium, mixed
16 fission products, cobalt-60 and then that
17 exotic radionuclide report; those are our
18 priorities right now that we are focused.

19 CHAIRMAN GRIFFON: Okay. All
20 right. That sounds good. And I think we'll do
21 what we just discussed at the upcoming Board

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1 meeting. Tim, you're going to probably
2 present similar to what you presented this
3 morning to the full Board, right? An overview
4 of the Addendum and then I'll just sort of
5 give a very brief status that the Work Group
6 discussed this as well and where we stand on
7 it, or if it doesn't come up in your
8 presentation, I'll at least raise the question
9 of the concern about trying to designating
10 workers by the badge number and that we
11 discussed it a bit and, you know, it seems
12 like you have a good basis for it. But also,
13 we've seen pitfalls on this before. And let
14 the full Board sort of discuss that I think is
15 the best way to go with this.

16 And then, hopefully, we'll get a
17 motion to move on this Class out of the next
18 Board meeting. Because I think the Savannah
19 River petitioners would appreciate that as
20 well.

21 So that's really all I have. Does

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1 anybody else have anything else to add?

2 I know we had a couple of folks
3 from the public, and I think one representing
4 the petitioner, if there's any comments at
5 this point? Okay. All right.

6 Tim, anything else? Ted, anything
7 else to add?

8 MR. KATZ: No, Mark. This is
9 Ted. Sounds all good.

10 CHAIRMAN GRIFFON: Well, we were
11 very efficient, and I think we're good to
12 adjourn.

13 If Jim and Brad, do you have
14 anything else to add before we adjourn?

15 MEMBER CLAWSON: This is Brad. I
16 just wanted to comment that Jim agreed with me
17 today. I thought that was a milestone right
18 there.

19 CHAIRMAN GRIFFON: Let the record
20 say that B- state that.

21 (Laughter.)

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1 Okay. All right. Very good.

2 Well, everybody have a good
3 weekend and if we don't talk before then,
4 we'll see each other soon in Hanford.

5 Meeting adjourned.

6 (Whereupon, the above-entitled
7 matter went off the record at 10:27 a.m.)

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