

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

+ + + + +

WORK GROUP ON BROOKHAVEN

+ + + + +

WEDNESDAY  
JULY 28, 2010

+ + + + +

The Work Group convened at the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 8:00 a.m. Eastern Daylight Time, Josie Beach, Chair, presiding.

PRESENT:

JOSIE BEACH, Chair  
HENRY ANDERSON, Member  
BRADLEY P. CLAWSON, Member  
WANDA I. MUNN, Member  
GENEVIEVE S. ROESSLER, Member

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## ALSO PRESENT:

TED KATZ, Designated Federal Official  
TIMOTHY ADLER, ORAU Team  
RON BUCHANAN, SC&A  
GRADY CALHOUN, DCAS  
LEO FAUST, ORAU Team\*  
JOSEPH FITZGERALD, SC&A  
EMILY HOWELL, HHS  
JOHN MAURO, SC&A  
JIM NETON, DCAS  
GENE POTTER, ORAU Team\*

\*Participating via telephone

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

2 (8:01 a.m.)

3 MR. KATZ: Good morning everyone in  
4 the room and on the line. This is the  
5 Advisory Board on Radiation Worker Health,  
6 Brookhaven Work Group, first meeting of the  
7 Work Group, I believe, right?

8 My name is Ted Katz, I'm the  
9 Designated Federal Official for the Advisory  
10 Board, and we're going to begin with roll call  
11 and since we're dealing with a specific site,  
12 please speak to conflict of interest as well.

13 Beginning with Board Members in the  
14 room, with the Chair.

15 CHAIR BEACH: Josie Beach, no  
16 conflicts with Brookhaven.

17 MEMBER CLAWSON: Brad Clawson, Work  
18 Group Member, no conflict with Brookhaven.

19 MEMBER ROESSLER: Gen Roessler, Work  
20 Group and Board Member, no conflicts with  
21 Brookhaven.

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1                   MEMBER MUNN: Wanda Munn, Board  
2 Member and Work Group Member, no conflicts.

3                   MEMBER ANDERSON: Henry Anderson,  
4 Board Member, no conflict.

5                   MR. KATZ: And do we have any Board  
6 Members on the line?

7                   (No response.)

8                   MR. KATZ: Okay. NIOSH ORAU Team in  
9 the room.

10                  DR. NETON: Jim Neton, NIOSH, no  
11 conflicts.

12                  MR. CALHOUN: Grady Calhoun, NIOSH,  
13 no conflict.

14                  MR. ADLER: Tim Adler, ORAU, no  
15 conflict.

16                  MR. KATZ: Any NIOSH or ORAU on the  
17 line?

18                  MR. FAUST: Leo Faust, ORAU Team.

19                  MR. POTTER: Gene Potter, ORAU Team,  
20 no conflicts.

21                  MR. KATZ: I'm sorry, you both were  
22 speaking at the same time. Try that again?

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1 MR. FAUST: Leo Faust, ORAU Team, no  
2 conflict.

3 MR. KATZ: Thank you.

4 MR. POTTER: And Gene Potter, ORAU  
5 Team, no conflicts.

6 MR. KATZ: Great, thank you and  
7 welcome. SC&A in the room?

8 DR. MAURO: John Mauro, SC&A, no  
9 conflict.

10 MR. FITZGERALD: Joe Fitzgerald, no  
11 conflict.

12 DR. BUCHANAN: Ron Buchanan, SC&A,  
13 no conflict with Brookhaven.

14 MR. KATZ: Any SC&A on the line?

15 (No response.)

16 MR. KATZ: Great. Then Federal  
17 Officials from HHS, DOE, DOL, other agencies  
18 or contractors to the feds in the room?

19 MS. HOWELL: Emily Howell, HHS.

20 MR. KATZ: And on the line?

21 (No response.)

22 MR. KATZ: Very good. And then do

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1 we have any members of the public who'd like  
2 to identify themselves as attending? On the  
3 line?

4 (No response.)

5 MR. KATZ: Okay, then, Josie, it's  
6 your agenda.

7 CHAIR BEACH: Okay. As you know, or  
8 if you don't know, the agenda is posted on the  
9 NIOSH website. We're going to start with a  
10 brief report from NIOSH on the Evaluation  
11 Report.

12 Then we'll go into the review of  
13 the matrix with SC&A and NIOSH. And then  
14 we'll take some time to look at a path forward  
15 for the Work Group for future meetings.

16 Just for a little brief history on  
17 Brookhaven. On December 18, 2008, the  
18 Advisory Board tasked SC&A to complete a Site  
19 Profile review for Brookhaven. That was  
20 completed and sent out in September of 2009.

21 During the Advisory Board Meeting  
22 in Port Jefferson on October 20th, a

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1 recommendation was made to add an SEC Class  
2 for Brookhaven from January 1st, 1947, to  
3 December 31st, 1979.

4 And during that same meeting, a  
5 Work Group was formed to look at the Site  
6 Profile review and to look at the years  
7 January 1st, 1980, through December 31st,  
8 2007. SC&A was also tasked, at that time, to  
9 do what was called a focused review of the  
10 Evaluation Report, and that we have before us.

11 The other thing I'd like to do is  
12 just take a minute to share some thoughts and  
13 goals, on the record, with regard to the Work  
14 Group meetings.

15 Kind of what I call ground rules.  
16 First, to every extent possible, any White  
17 Paper to be discussed, should be made  
18 available to the Work Group, NIOSH, SC&A, at  
19 least one week in advance of the scheduled  
20 Work Group meeting.

21 If material is provided at the  
22 table, a discussion may be limited to just

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1 clarifying what is being given, without actual  
2 deliberations on the content.

3           And then, second, we should use  
4 Work Group meetings to deliberate on SEC-  
5 related questions, adequacy, completeness and  
6 integrity.

7           Purely technical or historical  
8 factual issues may be better addressed in one-  
9 on-one technical calls or meetings and notes  
10 would be taken during those meetings.

11           Three, the Board's role includes  
12 independent validation of Evaluation Reports,  
13 assumptions, and judgment of historical facts  
14 and should not be construed as questioning the  
15 rigor behind the Evaluation Report.

16           A discourse between NIOSH, DCAS and  
17 SC&A, serve to inform the Work Group and the  
18 Board's future recommendations on Brookhaven.

19           And, fourth, the Work Group's  
20 process is designed to use deliberative  
21 process to allow narrow scope of the SEC  
22 important issues and questions, to the point

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1 where the Work Group is in a position to  
2 advise the broader Board on any remaining  
3 issues, and should be discussed prior to the  
4 vote on recommending, regarding the SEC.

5 So, that's kind of my standard  
6 before each meeting, so that everybody knows,  
7 kind of, where we're at and what's expected  
8 for the Work Group meetings.

9 And, with that, I think we're  
10 ready, Grady, if you want to give us a brief  
11 overview of the Evaluation Report.

12 MR. CALHOUN: Okay. Basically, when  
13 we started to look at Brookhaven, the thing  
14 that jumps out is record keeping. But, just  
15 some basics is they have a lot of data, a lot  
16 of data.

17 Urinalysis began in 1949. Whole  
18 body counts began in 1960. There's a lot of  
19 follow-up bioassays for incidents, for, I  
20 guess I'll say more exotic-type radionuclides.

21 It was a very, very diverse, or is  
22 a very, very diverse site. There's reactors

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1 on the site, there's a lot of linear  
2 accelerators on the site. And there's a bunch  
3 of research done on the site.

4 There are rad facilities and non-  
5 rad facilities. There's a bunch of people  
6 that never touch an atom of radioactivity, and  
7 there's a bunch of people that do.

8 So it's a, I don't know how many of  
9 you have been there. It's laid out kind of  
10 like a university, to me, it seems like. And  
11 with a wide variety of work.

12 What we found, when we started  
13 looking into the Evaluation Report is, at  
14 first, like I said earlier, you know, we've  
15 seen the internal and external records and how  
16 many of them were there.

17 The external dosimetry program has  
18 been consolidated, and the records have been  
19 consolidated, since basically the beginning of  
20 BNL operations. Internal dosimetry is a  
21 different story.

22 So usually it was a lot of records,

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1 but your issue became, what's the availability  
2 of those records? I know that there's a bunch  
3 of records there, but if John Smith needed to  
4 get a urinalysis or a whole body count, how do  
5 I know if John Smith's urinalysis or whole  
6 body count results are available?

7 So this not only came to our  
8 attention because of the Evaluation Report,  
9 but not too far away in time we found, in  
10 older cases, that we would get responses from  
11 Brookhaven that said no bioassay available.

12 But then we would get bioassay.  
13 So, not from them, but we got it from the  
14 claimant, is what started us to look more in  
15 depth with this.

16 So basically, after a bunch of  
17 interviews and data capture, we had to try to  
18 come up with a way to determine when were  
19 records available, readily accessible and  
20 something that you could count on.

21 And there's a couple of things that  
22 came to our mind. First of all, we found a

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1 letter, it was a 1979 letter, basically  
2 saying, you know, we need to centralize whole  
3 body counts because they're all over the  
4 place.

5 And when I say all over the place,  
6 I mean physically all over the place. They're  
7 in the little file kingdoms and different  
8 projects across the site.

9 So that was an indication that they  
10 recognized that there was an issue. We needed  
11 to come up with a way of how to, to try to  
12 verify retrievability of bioassay whole body  
13 count records.

14 And one of the things that we  
15 found, doing our data capture, is that we  
16 would find memos that would list individuals.  
17 And, you know, there may be five people, there  
18 may be 25 people.

19 And it would say these people in  
20 your organization need to be whole body  
21 counted or have a urinalysis. And this is  
22 what the radionuclides are that they need to

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1 be tested for.

2 So what we did is we got those  
3 records and we got 69 names of those records.

4 And these were not necessarily claimants.  
5 Some of them may have been, but most of them  
6 were not.

7 And we asked Brookhaven to do a  
8 search of, there's basically three  
9 repositories that they have there. Give us  
10 everything you've got on these 69 people.

11 And what we did is we broke up  
12 those 69 people by decade. And tried to look  
13 at the percentage of return that we would get.

14 So if they said John Smith got a whole body  
15 count in 1975, we had to see the results from  
16 John Smith's whole body count in 1975, to see  
17 if it was retrievable.

18 And what happened is -- the '80s  
19 and '90s, is where we really started getting  
20 high level of retrievability, '70s, '60s,  
21 '50s, it just wasn't there.

22 We know that the individuals were

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1 requested to get whole body count or have a  
2 urinalysis but the data just wasn't there. At  
3 least it wasn't there as far as Brookhaven was  
4 concerned.

5 They didn't give it to us. So, we  
6 decided that based on those results, 1980 was  
7 a good cutoff date.

8 We had 100 percent retrieval in the  
9 1990s, and the 1980s was off by one  
10 individual. We did find a whole body count  
11 for that individual, but it was more than a  
12 year afterward so we didn't count it.

13 We counted that to be 100 percent  
14 retrieval for that decade as well. We realize  
15 it's a small sample size, but that's how we  
16 did it. Because we were more concerned about  
17 retrievability than just gross numbers.

18 Because gross numbers don't tell  
19 you a whole lot, when we need the individuals  
20 dosimetry reports.

21 CHAIR BEACH: Can I ask you a  
22 question?

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1 MR. CALHOUN: Yes, ma'am.

2 CHAIR BEACH: So in 1980, of the 69  
3 individuals, you got 100 percent minus one --

4 MR. CALHOUN: Yes, but the 69 were  
5 spread out over six years. So it was  
6 probably, six decades. So it was probably  
7 eight per decade.

8 CHAIR BEACH: So eight individuals  
9 in 1980s?

10 MR. CALHOUN: Yes, eight or nine,  
11 yes.

12 CHAIR BEACH: I just want to make  
13 sure on the number.

14 MEMBER ROESSLER: Can I ask, add to  
15 that question? So in '79, there was this  
16 letter indicating that things should be better  
17 centralized. Then did you find an indication  
18 that there was a follow-up to that?

19 MR. CALHOUN: Actually, I did, but  
20 that's not, that's something I just found in  
21 the last couple of days. So, and I'll tell  
22 you about it.

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1                   MEMBER ROESSLER: Okay, I'll just  
2 wait --

3                   MR. CALHOUN: I hate to throw stuff  
4 up that's brand new, but I've been spending a  
5 lot of time going through this.

6                   MEMBER ROESSLER: What would be an  
7 indication to that something took place --

8                   MR. CALHOUN: Well, the first thing  
9 is, I think is the retrievability test that we  
10 did. As in the 1980s, things started getting  
11 a lot better.

12                   In the last week or so, I found a  
13 letter in May, 1980. And it was a request  
14 from a guy named Miltenberger, and I can give  
15 you the SRDB number for these documents, if  
16 you need them.

17                   But he was asking individuals at  
18 the HFBR, the High Flux Beam Reactor there.  
19 He said, you know, we're missing whole body  
20 count records.

21                   He's asking this to the Project  
22 Manager. We're missing some whole body count

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1 records, could you search your records because  
2 we need to update, so I can update our  
3 bioassay and dosimetry records.

4 And what he did was he presented a  
5 table of individuals, and he listed from 1973  
6 to 1980, the records that he didn't have. And  
7 he, you know, this guy needed a whole body  
8 count in this year, we don't have it.

9 He listed all of those. And then  
10 there's a couple back and forths with them. I  
11 went through the records that we have. At the  
12 time, now this was in May of 1980, this  
13 request went out.

14 And there were only two records  
15 missing from 1980. If you go back to '79 and  
16 '78, there's many, many records that are  
17 missing.

18 And actually we have the results  
19 from those two individuals. They were found  
20 and we actually have them in our Site Research  
21 Database that we captured on a data capture.

22 So, everything from 1980, that he

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1 thought was missing, and he went out and made  
2 a request to the project manager there, I  
3 think his name was Rothman, it says.

4 We got those two for 1980, so 1980  
5 was complete, '79 wasn't. Big difference  
6 between '79 and '80. So that's just another  
7 indication that they did something and the  
8 records are, the records seem to be a lot more  
9 available. That's basically it. That's what,  
10 that was what we hinged our 1980 determination  
11 on.

12 CHAIR BEACH: So how many people are  
13 we talking about in 1980? You mentioned 69  
14 over the decades.

15 MR. CALHOUN: I think it was eight  
16 or nine.

17 CHAIR BEACH: So there's only eight  
18 or nine people that needed --

19 MR. CALHOUN: No, no, these were --

20 CHAIR BEACH: So how many people --

21 MR. CALHOUN: This was a sample.

22 Now the sample was based on records that we

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1 had that said, they're basically lists. And  
2 they would list individuals and say this  
3 person needs to be whole body counted or have  
4 a urinalysis for these radionuclides.

5 You took a sample of those and  
6 tried to do a retrievability test.

7 CHAIR BEACH: So, beyond the sample,  
8 how many people would you say had bioassay  
9 data in the 1980s?

10 MR. CALHOUN: Oh, I don't know. We  
11 may have that, I don't know that, hundreds.

12 CHAIR BEACH: Hundreds?

13 MR. CALHOUN: Hundreds.

14 CHAIR BEACH: And then, and you did  
15 a sampling of eight individuals out of that  
16 hundreds?

17 MR. CALHOUN: Out of the 69.

18 CHAIR BEACH: Out of the, but the 69  
19 was spread over --

20 MR. CALHOUN: Yes.

21 CHAIR BEACH: Several years, okay.

22 DR. BUCHANAN: I can clarify that.

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1 MR. CALHOUN: Thirteen in the '80s.

2 MEMBER ANDERSON: And then it's  
3 spread out over the '80s?

4 MR. CALHOUN: Yes.

5 DR. NETON: I think it's important  
6 to point out here that the premise here is  
7 that Brookhaven, correct me if I'm wrong  
8 Grady, but we believe had an adequate  
9 radiation monitoring program in place.

10 I'm assuming that we have evidence  
11 of procedures and documents and such saying  
12 that the workers were covered when there was a  
13 need to be covered, the potential was there.

14 Now that's something that we can  
15 debate, but if that were true, then the  
16 question is, what Grady did.

17 They went back and sampled and  
18 said, well, they found memos saying they put  
19 program is in place. Here's a record that  
20 says these people should have been sampled,  
21 can we verify that they actually indeed were.

22 And not until 1980, did we have any

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1 confidence that the data could be retrieved.  
2 They are probably there somewhere, it's just  
3 you don't know where they are.

4 MR. CALHOUN: The Brookhaven Site,  
5 because it was so varied, it wasn't like some  
6 of the other Sites where everybody who walks  
7 into the controlled area, gets a badge. And  
8 everybody who walks into the controlled area  
9 has a urinalysis.

10 And everybody that walks into the  
11 controlled area has whole body counts.  
12 Because of the diversity of that site, it was  
13 dependent on the actual individuals and what  
14 jobs they were doing.

15 Back to the, gosh, I want to say  
16 the '60s. The policy was that they would  
17 monitor people that had the potential of  
18 receiving ten percent of the limit.

19 And so it was always a project  
20 activity-specific type assignment of need for  
21 dosimetry, whether it's internal or external.

22 MEMBER ROESSLER: Let me try to know

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1 what we're doing here. You're bringing up  
2 things before 1980, but that Class, the --

3 MR. CALHOUN: Right, they're done.  
4 I'm not worried about that. That's done.

5 MEMBER ROESSLER: So you're more or  
6 less confirming what the decision already was.

7 MR. CALHOUN: Yes, yes.

8 MEMBER ROESSLER: And what we really  
9 need to focus on is the adequacy of the  
10 program starting in 1980?

11 MR. CALHOUN: Yes, that's true.

12 MEMBER ROESSLER: And so any of  
13 these comments about what was done are  
14 pertinent only to the one that's already in  
15 SEC.

16 MR. CALHOUN: Yes, yes, yes.

17 MEMBER CLAWSON: Well, this is one  
18 of the questions that I had, because basically  
19 looking at the graphs and charts of how many  
20 bioassays or *in vivo* and so forth like that, I  
21 don't see an increase, you know, or anything  
22 else that's around the '80s.

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1                   And that's why I'm interested in  
2                   why the '80s --

3                   MR. CALHOUN: An increase really  
4                   wouldn't indicate anything. What we're  
5                   looking at is retrievability because, only if  
6                   we had a static workforce, that we had a  
7                   certain number that we are going to monitor,  
8                   would an increase or a decrease be any kind of  
9                   indication of the monitoring program.

10                  Because the workforce fluctuated a  
11                  lot and the different activities fluctuated a  
12                  lot. So just a gross increase in the number,  
13                  or decrease in the number of people monitored,  
14                  really isn't going to tell you much about the  
15                  adequacy of the program or retrievability.

16                  For sure, it's going to tell you  
17                  nothing about retrievability.

18                  MEMBER CLAWSON: No, and that's  
19                  absolutely true, and if you don't have the  
20                  documentation there or the bioassay it's not  
21                  going to tell you anything else.

22                  My understanding is they didn't

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1 have any kind of centralized bookkeeping.  
2 Everybody was kind of out on their own, is  
3 that correct?

4 MR. CALHOUN: I, like I said, the  
5 determination on whether someone would be  
6 monitored or not, was based on an activity.  
7 So, if you had potential to receive whatever  
8 the threshold was, you were monitored  
9 internally and externally.

10 It wasn't everybody. Because, like  
11 you said, if you've ever been on that site,  
12 it's like walking onto a, it's like walking  
13 onto to a university.

14 And the pockets of radiological  
15 activities were, you know, spread out.

16 CHAIR BEACH: So the original SEC  
17 from '47 to '79, that was given to everybody  
18 on the Brookhaven Site?

19 MR. CALHOUN: Everybody.

20 CHAIR BEACH: Okay. So everybody on  
21 site had the potential to come into contact  
22 with some type of dose?

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1                   MR. CALHOUN: There was no way to  
2 determine if they couldn't.

3                   CHAIR BEACH: And did that change  
4 after 1979, that theory?

5                   MR. CALHOUN: No, no, we believe  
6 that everybody was monitored appropriately.  
7 The issue is retrievability of the records.

8                   CHAIR BEACH: Right.

9                   MEMBER ROESSLER: So pointing to  
10 that issue, and in the ER here, it talks about  
11 1979, and there's a report by Hall, which I  
12 don't have here.

13                   MR. CALHOUN: Right.

14                   MEMBER ROESSLER: It talks about,  
15 and we're talking about whole body counting  
16 records, switching them from the medical  
17 division to the S&EP.

18                   Now apparently that sort of was the  
19 evidence that something new has happened and -  
20 -

21                   MR. CALHOUN: Yes, that was part of  
22 our puzzle. That kind of triggered us to, I

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1 mean it actually is independent of, but  
2 supports the 1980 take.

3 You know, obviously somebody felt  
4 that there was a need to get a better grip on  
5 the internal dosimetry records and centralize  
6 them. And that came out in 1979.

7 MEMBER ROESSLER: That was the  
8 indication that there was a need.

9 MR. CALHOUN: Yes.

10 MEMBER ROESSLER: Now do you have  
11 another indication that it actually took  
12 place?

13 MR. CALHOUN: I believe that our  
14 retrievability sample is -- supports that  
15 tremendously. And I also believe that this  
16 other thing that I just found about them  
17 actually going out and saying, hey, we've got  
18 missing records, we need to gather these  
19 together so that we can update our dosimetry  
20 and bioassay records, supports that as well.

21 Now that's one I just threw at you,  
22 because I just found it a couple of days ago.

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1                   MEMBER ROESSLER: It would seem like  
2                   this new division, S&EP is probably Safety and  
3                   --

4                   MR. CALHOUN: And Environmental  
5                   Protection, I would imagine.

6                   MEMBER ROESSLER: Something like  
7                   that.

8                   MR. CALHOUN: I don't think it's a  
9                   new division, but --

10                  MEMBER ROESSLER: It would seem like  
11                  there might, I would expect to go there and  
12                  find some new, in 1980 or '79, some new  
13                  evidence that they're saying, okay, we're  
14                  going to square this away.

15                  And you haven't looked for that  
16                  yet.

17                  MR. CALHOUN: Well, all we have so  
18                  far, and if you've got anything new, Tim, you  
19                  can tell me. But is what we have is a memo  
20                  that said we need to do it.

21                  We have the records that indicate  
22                  that the difference between the '70s and '80s

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1 is significant, as far as retrievability goes.

2 And I've also got the memo from May  
3 of 1980, that says, you know, we need these  
4 records. We found that these records were  
5 missing.

6 If you've got copies of them, send  
7 them to me. And I looked through our database  
8 and I found all of the records, although there  
9 were only two that were missing in 1980, and  
10 these are, these are not checkmarks that just  
11 say they were taken, these are the actual  
12 whole body count results.

13 And in 1979, not nearly as much. I  
14 would say more than 50 percent of them were  
15 missing.

16 MEMBER ROESSLER: So this author in  
17 1980, Cohn, wasn't he the whole body counter  
18 supervisor there?

19 MR. CALHOUN: Cohn, yes --

20 MEMBER ROESSLER: Well, I guess what  
21 I'm looking for is some records there, once  
22 this was transferred, to say we, we now have -

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1 -

2 MR. CALHOUN: I don't have anything  
3 that says, okay, we've got them all here in  
4 one spot. I don't have it.

5 MEMBER ANDERSON: Or we've changed  
6 the procedure, so that's --

7 MEMBER ROESSLER: Yes, that's what  
8 would really --

9 MR. CALHOUN: I would --

10 MEMBER ROESSLER: But I'm not sure  
11 you've really looked at everything yet.

12 DR. NETON: Is there evidence that  
13 they actually may have consolidated data?

14 MR. CALHOUN: They are still in the  
15 process of doing it. If you look, what you'll  
16 find is, you know, sure, I've got individual  
17 counts that give the spectrum -- I normally  
18 think of as the whole body count result.

19 But a lot of the results are  
20 tabular. You know, I may have 15 people that  
21 were counted in March of whatever, 1979 or  
22 1982, and it lists, you know, potassium

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1 results and cesium results and other  
2 radionuclides.

3 So actually, what we're, the one  
4 thing we've done, is we're linking those to  
5 our NOCTS database. And I know that they're  
6 in the process of getting them. Now, we re-  
7 request data for many individuals at the  
8 Brookhaven Site, based on our findings and we  
9 ended up getting data, internal dosimetry data  
10 and X-ray data that we had not previously  
11 received from them.

12 Because now they know where to  
13 look, you know. So a lot of these whole body  
14 counts were in the medical files, and they  
15 had not been going through those medical  
16 files.

17 And now we're getting those records  
18 and the entire medical file. So, they're  
19 still in the process of trying to make them  
20 more retrievable, because I believe when they  
21 actually did the counts, a lot of the results,  
22 like I said, are in more of a tabular fashion.

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1                   They were kept that way.

2                   MEMBER ROESSLER: So back to this  
3 Cohn reference. It says Cohn, 1980, response  
4 to memo of August 27th, concerning Biomedical  
5 whole body counter correspondence to  
6 Miltenberger. What did that say?

7                   CHAIR BEACH: Gen, are you on the ER  
8 Report?

9                   MEMBER ROESSLER: I'm on the ER  
10 Report.

11                  CHAIR BEACH: What page?

12                  MEMBER ROESSLER: I'm looking in the  
13 reference list now, on page -- which I think  
14 is page 82.

15                  I'm just trying to follow through,  
16 just looking for something that confirms even  
17 more than you have, that in 1980 there was a  
18 change. It's very short.

19                  DR. BUCHANAN: Very short.

20                  MEMBER ROESSLER: Okay.

21                  MR. CALHOUN: And I don't know that  
22 one off the top of my head.

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1                   MEMBER ROESSLER: Have you talked  
2                   about Miltenberger, about anything that was  
3                   going on at the time. I don't think he's at  
4                   BNL anymore.

5                   MR. CALHOUN: I don't know if we  
6                   interviewed him or not.

7                   MR. ADLER: We did interview him.  
8                   At the time we interviewed him, we had not  
9                   talked about the 1980 date. We weren't that  
10                  far along in the process.

11                  But, I think it's evident, from  
12                  these memos anyway, that the change did occur  
13                  certainly. Whole body counting came under  
14                  S&EP at this point.

15                  It's not -- as I read these memos,  
16                  that they've now took charge in talking to Bob  
17                  and some other people, the issue of whole body  
18                  counts being in medical files is a non-issue  
19                  after the 1980 time frame.

20                  A little less scattering there, at  
21                  any rate, and more centralized oversight of  
22                  the sample retention, to some extent.

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1 Evidently from our study, at any rate.

2 CHAIR BEACH: So I guess I'm not  
3 clear with, Tim, what you just said. You said  
4 it was a non-issue, then you said it was a  
5 little less gathering.

6 MR. ADLER: Oh, well, prior to 1980,  
7 medical was doing the whole body count. And  
8 in this memo, in 1979, from Paul Miltenberger  
9 expresses his concern for lack of follow-up  
10 and oversight of the whole body count, which  
11 is the primary monitoring means for them at  
12 that time.

13 Prior to 1980, if medical was doing  
14 the whole body counts, records were being  
15 retained by medical and we weren't getting in  
16 people's files, as Miltenberger had wished,  
17 evidently.

18 And so he asked to take over the  
19 whole body counter being used by Marshall  
20 Islands project. And they used that, take  
21 over that project, as well, used that counter  
22 for all the people under S&EP's purview.

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1                   Which was basically everybody, all  
2                   the HP work. So, there's a complication that  
3                   when they had to send that counter down to  
4                   Marshall Islands, they were without one.

5                   That, then spurs this other memo,  
6                   you'll see, requesting use of the medical  
7                   whole body counter during the short periods,  
8                   and they get an agreement, yes, we can still  
9                   use your counter, but we want to retain the  
10                  data, sort of thing.

11                  So, after 1980 -- I'm sorry to  
12                  interrupt. After 1980, the whole body counts  
13                  don't show up in the medical records nearly so  
14                  much.

15                  CHAIR BEACH: They show up in  
16                  personal records?

17                  MR. ADLER: In personal records,  
18                  S&EP records.

19                  MEMBER ROESSLER: Miltenberger is at  
20                  Sandia.

21                  MEMBER CLAWSON: So what type  
22                  electronic databases do we have on this? Is

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1 everything an electronic database or is it in  
2 hard copy?

3 MR. CALHOUN: It's like, I think  
4 most of it is probably from a bioassay sample  
5 and it is scanned. I know that the external  
6 documents have been in one central electronic  
7 database for a long, long time.

8 CHAIR BEACH: Okay, any other  
9 questions on the ER?

10 DR. MAURO: I have just a question.

11 CHAIR BEACH: Yes, go for it, John.

12 DR. MAURO: So, now you have a  
13 number of claims that have come in post-'80?

14 MR. CALHOUN: Yes.

15 DR. MAURO: And how many have you  
16 processed so far?

17 MR. CALHOUN: Post-'80?

18 DR. MAURO: Well, the ones that are  
19 not covered by the SEC?

20 MR. CALHOUN: So non-presumptives  
21 and post-'80, I can look that up real quick.

22 DR. MAURO: Just give me an idea,

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1 are we talking thousands?

2 MR. CALHOUN: No, gosh, no.

3 DR. MAURO: Hundreds?

4 MR. CALHOUN: No.

5 DR. MAURO: Dozens?

6 MR. CALHOUN: Yes, yes, I would say  
7 probably less than 200. Brookhaven, this is a  
8 bit of a side note -- but Brookhaven is a very  
9 low, there should be way more claims than  
10 there are.

11 And, you know, when we were out  
12 there, we actually talked to them about that.

13 And it doesn't make sense that there's so few  
14 claims.

15 DR. MAURO: Now when you go through,  
16 let's say, a given claim, the dozens or  
17 whatever that were done, and you look at this  
18 person's work history.

19 And you say, okay, he worked over  
20 here with, I presume you have a pretty good  
21 record of where he was, what he did, the  
22 function of time.

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1           And you make your own judgment as  
2     to, okay, apparently this person had some  
3     potential for exposure to this, this, this and  
4     this, from your perspective. And you say,  
5     okay, on that basis, am I able to go into his  
6     records and find the whole body counts or the  
7     bioassay samples that you believe are needed  
8     to reconstruct the person's --

9           MR. CALHOUN: And actually one of  
10    the things that we're in the process of doing,  
11    over the last few days, to try to get ready  
12    for this, I started going through all the, not  
13    all, through many of the cases that had  
14    employment post-1979.

15           Preferably at the jump. You know,  
16    they had a little bit on both sides. And what  
17    we have done is, I don't how familiar you are  
18    with SRDBs, the documents associated with  
19    Brookhaven.

20           DR. MAURO: No.

21           MR. CALHOUN: But we've actually  
22    linked many of the whole body counts. So we

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1 get, on the return, the re-request, I'll say,  
2 we get a much better return for internal  
3 dosimetry and X-ray.

4 But we've also gone so far as to  
5 link the documents that we've found, that list  
6 John Smith's whole body count in 1969 or '82,  
7 or whatever, to our whole body count, to our  
8 internal dosimetry records, and we use those.

9 So, yes, we do, we have them. And  
10 there's a, you know, there's never been an  
11 issue with the external dosimetry records.

12 So, certainly if I'm going through  
13 the dosimetry records, for those  
14 reconstruction, I'm going to look was the guy  
15 monitored for external dose? Did have any  
16 external dose?

17 You know, if he had some external  
18 dose, or even if he was monitored, there's  
19 probably reasonable chance that he should have  
20 had some kind of internal dosimetry, or have  
21 been monitored.

22 I'll also look at the CATI, you

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1 know, were you monitored? And it works great  
2 if the guy was alive when he gave the CATI, it  
3 doesn't work so well when he's not. But, yes,  
4 those, a lot of those are in there.

5 And I think they're continuing to  
6 be put in there. Because we've got tons of  
7 documents from Brookhaven.

8 CHAIR BEACH: Yes, I looked.

9 MR. CALHOUN: Ton, tons, yes.

10 CHAIR BEACH: Definitely --

11 MR. CALHOUN: Yes.

12 CHAIR BEACH: SRDB numbers.

13 MR. CALHOUN: It was, when we went  
14 to the place there was probably, the room was  
15 probably four of these and the walls were full  
16 of documents.

17 And we captured most of those that  
18 had anything to do with dosimetry --

19 CHAIR BEACH: Have you done any  
20 interviews with any workers to date?

21 MR. CALHOUN: I don't know if we  
22 have or not.

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1                   MR. ADLER: We've interviewed a few.  
2           I don't have a list in front of me. We've  
3 done about 14 interviews, I guess.

4                   CHAIR BEACH: Was it for post-1980  
5 or --

6                   MR. ADLER: Scattered throughout.

7                   CHAIR BEACH: Just scattered?

8                   MR. ADLER: Yes.

9                   CHAIR BEACH: Are those all listed  
10 on the O: drive?

11                   MR. ADLER: They would be, all the  
12 interviews are in the SRDB.

13                   CHAIR BEACH: Because I wouldn't  
14 mind a copy of the SRDB numbers for the  
15 interviews, at some point. That would be  
16 helpful. I looked on the O: drive and there's  
17 so many when you start opening just --

18                   MR. ADLER: Right, yes. They're  
19 usually       filed       under       communication  
20 documentation. But I'll get you the --

21                   CHAIR BEACH: They just come up  
22 under numbers.

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1 DR. BUCHANAN: I believe page 14 of  
2 your ER, are these your interviews here on  
3 page 14?

4 MR. CALHOUN: I'd have to look. It  
5 looks to me like they are.

6 DR. BUCHANAN: And they give it  
7 here, the number.

8 CHAIR BEACH: Okay, thank you.

9 MR. CALHOUN: Oh, yes, absolutely,  
10 yes.

11 MR. ADLER: They do. How many --

12 MR. CALHOUN: There's ten listed.

13 MR. ADLER: Ten, okay.

14 CHAIR BEACH: Well, it looks as if  
15 Ron just saved you a lot of work.

16 MR. CALHOUN: We're all about that,  
17 that's good.

18 CHAIR BEACH: Okay, are we ready to  
19 jump into the matrix?

20 MR. CALHOUN: Sure.

21 CHAIR BEACH: Okay.

22 MR. FITZGERALD: Okay.

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1 CHAIR BEACH: Kick it off.

2 MR. FITZGERALD: Take it away,  
3 right. Actually we have two issues, which is  
4 maybe perhaps a little unusual for SC&A. And  
5 actually one central issue. Certainly we have  
6 some questions on neutrons based on what we've  
7 looked at in terms of the documentation on-  
8 site.

9 But the central issue is record  
10 keeping for internal dosimetry and bioassay.  
11 And I actually am comfortable with Grady's  
12 description of the conditions in the earlier  
13 pre-'80 and where things are going now.

14 I think, based on our interviews  
15 and discussions, you know, we found much of  
16 the same thing. This is a site, as Grady  
17 pointed out, it's a very diverse set of  
18 operations.

19 You had research reactors. You had  
20 medical isotope applications. You had  
21 accelerators. So it truly was a campus of  
22 sorts, with various activities spread around.

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1           And a long history, a 50 some plus  
2     year history. So you had different activities  
3     starting up, different activities stopping.  
4     Projects beginning and ending. So it is a  
5     much different scene than you would have at a  
6     production facility, this being a research  
7     laboratory.

8           But, at the same time, particularly  
9     for internal, it was a very decentralized  
10    system, in terms of how records were kept.

11           And I'm talking about records. I  
12    think, Jim made the point that, from the  
13    standpoint of actual monitoring, we didn't see  
14    any issues either.

15           So this is really focused on the  
16    accuracy and completeness of the record  
17    keeping for bioassay, a very focused question.

18           And the SEC through '80, hinges on  
19    that question, which is certainly before that,  
20    as apparently everybody agrees, that that  
21    decentralized system of record keeping was  
22    such that you could not, in fact, retrieve the

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1 necessary records to support those  
2 reconstruction.

3 We focused on that entire span  
4 closely and looked for, not only the  
5 programmatic changes. You know, granted, as  
6 you got into the '80s, almost anywhere in the  
7 DOE complex, people were talking about how  
8 can we improve the way we maintain, you know,  
9 records and how we do dosimetry.

10 That led, ten years later of  
11 course, to the accreditation program but, you  
12 know, certainly that thinking started, you  
13 know, late '70s into the '80s.

14 The energy research labs were a bit  
15 behind that curve. You know, just simply  
16 because they didn't have the kind of sources  
17 and exposures that would be, to provide the  
18 urgency of getting handled.

19 So they did come along, but it  
20 wasn't as quickly, perhaps, as some of the  
21 production facilities. At Brookhaven, what we  
22 focused on was the actual manifestation, the

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1 actual implementation of the directives, the  
2 procedures.

3           Could you actually see record  
4 keeping becoming more complete, centralized  
5 and retrievable? I think a lot of things that  
6 Grady said earlier about going back and  
7 looking at retrievability and you know, more  
8 or less testing and validating is what we were  
9 looking at, looking for in the Evaluation  
10 Report, the ER.

11           We did not see that, and that's the  
12 extent of what we have as a basis for our  
13 concern is that the ER cites these  
14 programmatic directives and memos and what  
15 have you, saying that, you know, we need to  
16 move forward and do these things.

17           And we just don't think that's  
18 adequate. We think that certainly the intent  
19 was there, but knowing how cultures are,  
20 safety cultures, not to mention health physics  
21 cultures.

22           We didn't think things would turn

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1 on a dime, certainly at a laboratory like  
2 this. It would take some time before that  
3 intent was manifest in actual changes and  
4 practices.

5 And then actual change, those  
6 practices led to better record keeping. So we  
7 wanted to focus on that. When did you  
8 actually see the kind of record keeping that  
9 would enable you to retrieve the information  
10 necessary for dose reconstruction.

11 And, not to put too fine a point on  
12 it, but we, in fact, interviewed the health  
13 physicist who, prompted by Grady and NIOSH,  
14 was going around the site, and I sort of felt  
15 sorry for him a little bit.

16 He was going around the site trying  
17 to find records. And he was going from one  
18 operation to another, just trying to figure  
19 out where everything was, you know, and he  
20 just told us it was a monster.

21 Because you're going back in time.

22 And, as he said, you know, he had supervisors

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1 who, and this is the way Brookhaven ran.

2           It was decentralized records. The  
3 supervisors kept the records, in a lot of  
4 cases, and if they retired they could have  
5 thrown them away.

6           They could have took them home.  
7 They could have passed them on to somebody.  
8 It was much more of an ad hoc affair. So, the  
9 job of trying to pull that together, going  
10 back that far in time, was pretty dramatic.

11           And they were going through and  
12 doing a yeoman's job. I'm not to say that  
13 they weren't putting the effort into it. I  
14 think actually this program, this is sort of a  
15 side benefit of this program, has prompted  
16 them to actually centralize in a much better  
17 sense their record keeping, such that they can  
18 respond to NIOSH's requests on the dose  
19 reconstruction.

20           So actually this program is driving  
21 a much better system there. But it gave me  
22 some pause to talk to this individual because,

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1 you know, he's sort of like a one-armed paper  
2 hanger.

3 And he was running around just, you  
4 know, trying to get this stuff together and  
5 come up with a centralized record system and  
6 he wasn't there yet.

7 And so, you know, you have to  
8 think, well, if you're not there yet and  
9 you're not even sure you'll ever be there,  
10 because of the questions of, you know, what  
11 happened to some of the records? There's a  
12 question of the completeness and accuracy then  
13 as to, you know, what do you have? When do  
14 you know you have it all, if you can't really  
15 establish that?

16 So that was really a lot of the  
17 thrust. And I'll certainly defer to Ron, as  
18 well, but I did the interviews at Brookhaven,  
19 talked to these people, talked to some of the  
20 principals. I won't name them but, you know,  
21 Brookhaven has some very notable health  
22 physicists who I think all of us would be

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1 familiar with, and really talked about this  
2 issue. And they were quite candid that, you  
3 know, yes, we started thinking about this in  
4 the '70s and '80s, and were putting this  
5 program in place, but it was a tough job and  
6 it took a while to get there. And that's the  
7 basis for our concern. When did they actually  
8 get there? Not when they were, you know,  
9 intending to do something or when they were  
10 putting it in place and implementing. But  
11 when did the program get to a place that you  
12 had a requisite body of records that you could  
13 rely on and feel was complete enough to  
14 support dose reconstruction?

15 And I didn't see that in the ER,  
16 and I think some of the things that Grady had  
17 pointed to, gives me some sense that there is  
18 ways to test that.

19 But, you know, right now I don't  
20 think we've seen the results of those tests  
21 and it sounds like some of them are ongoing,  
22 so I would leave the Work Group with that

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1     notion that, you know, we're dealing with a  
2     situation where Brookhaven is putting a lot of  
3     effort into getting these records into a place  
4     where they could be used, but the question is  
5     at what point is there enough there that  
6     there's confidence you could use it for dose  
7     reconstruction.

8             And I think, it sounds like NIOSH  
9     is moving in the right direction, but we  
10    didn't see that in the ER, so this may be  
11    something that the Work Group may want to  
12    investigate further.     Just to see that  
13    validation.   That's the key thing for me, the  
14    validation that given the circumstances at the  
15    site, that you have the records.   And not the  
16    intent, not the procedures, but you have the  
17    records.   And as that HP seemed to suggest  
18    last year, it seemed like a work in progress  
19    at the time.

20            Ron, do you want to walk through  
21    the -- any questions on that before Ron goes  
22    through the matrix in more detail?   We do have

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1 another issue on neutrons, but I just wanted  
2 to pass that on since we spent some time last  
3 year doing that.

4 MEMBER ROESSLER: I have just one  
5 question. Andy Hall keeps coming up in  
6 records as being the one who said we really  
7 have to get this squared away.

8 Did you have any access to any of -  
9 - now he died I don't remember when --  
10 anything that he might have written following  
11 all of this? Do you have any records from  
12 him?

13 MR. FITZGERALD: We were looking for  
14 correspondence, memos, but we did not see  
15 anything that he had in the file, necessarily.

16 And, again, keep in mind, so we  
17 were doing a Site Profile, so we were kind of  
18 looking broadly speaking and focused on, you  
19 know, the broader picture. But I think one of  
20 the issues, looking at this hinge point, in  
21 1980, would be to focus in on the  
22 implementation aspects, when did that actually

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1 manifest itself.

2 But more so, you know, the  
3 retrievability of the records, I think, and I  
4 think -- I would agree, I think that's one  
5 way to go. One test is retrievability.  
6 Another test, though, is looking at the  
7 records themselves. That would seem to  
8 suggest that there were actually records  
9 missing for certain years, for certain  
10 locations.

11 And I would like to see that laid  
12 out as to, you know, what in essence do we  
13 have? What records do we have? For what, you  
14 know, we know what the, what locations, what  
15 facilities had potential uptakes and where  
16 they did monitoring.

17 What's the, you know, what does  
18 Brookhaven have in the way of records for  
19 those sites? And we don't really have that,  
20 per se. And that would be very helpful.

21 MR. CALHOUN: Do you have any  
22 specifics on where, where records were found

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1 to be missing after 1980?

2 MR. FITZGERALD: No. I was just  
3 saying that, you know, given what, this  
4 individual, and I can give you the name off  
5 the phone, but given what this individual was  
6 saying, he was in the process, and this was a  
7 year ago, of pulling these records together, I  
8 think in response, Grady, to NIOSH's request.

9 And I'd like to see, you know, a sort of  
10 snapshot of what he's got right now, you know.

11 How complete is it? Where does he feel it's  
12 incomplete? And, you know, he did express  
13 some concern that some of these records may  
14 not be retrievable because they were destroyed  
15 or lost, given the ad hoc and decentralized  
16 nature of the program.

17 CHAIR BEACH: Is that one of the  
18 interviewees?

19 MR. FITZGERALD: Yes.

20 CHAIR BEACH: Those records are on  
21 the website. They're in a file under  
22 Brookhaven, that Kathy put together, I

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1 believe.

2 MR. FITZGERALD: Well, the  
3 interview.

4 CHAIR BEACH: The interview, yes.

5 MR. FITZGERALD: Interviews, yes,  
6 not the records.

7 CHAIR BEACH: Not the records,  
8 sorry.

9 DR. BUCHANAN: That's reference  
10 71451, Joe is talking about.

11 MR. FITZGERALD: But I think, you  
12 know, again, it would be helpful having that.  
13 Because if he's putting together, then I  
14 think what you'll have is facilities, time  
15 frames and numbers of records. I think  
16 there's actually, to look at this issue, the  
17 retrievability test is useful. The mapping of  
18 what they have now and what they think they  
19 don't have would be useful.

20 And those would be foundations for  
21 answering the question, I think. And to go  
22 back to Genevieve's comment, any more evidence

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1 of actual implementation of these memos, and I  
2 don't know, you know, it's sort of like trying  
3 to find some evidence that something happens  
4 after the memos --

5 MEMBER ROESSLER: If you had some  
6 date that something occurred, then you'd be  
7 able to better focus on --

8 MEMBER ANDERSON: When the office  
9 opened kind of thing.

10 MEMBER ROESSLER: Yes.

11 MR. FITZGERALD: And you know,  
12 Brookhaven, like some of the energy research  
13 labs, it's almost, you almost have to find the  
14 right cubbyhole to find somebody's  
15 correspondence file, let alone records.

16 So, in a way, it may mean finding  
17 out where Hall's, Andy Hall's, you know,  
18 correspondence ended up. And we didn't see  
19 it, so I have a feeling it's somewhere on site  
20 and we can certainly look for that.

21 MEMBER MUNN: Well, not only that,  
22 you need to have very clear information as to

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1 when a project starts and when it begins.

2 In a research and development  
3 laboratory, those things can literally turn on  
4 a dime. And you may start a project one week,  
5 with the expectation of running it for a year,  
6 and decide the results are not worth doing and  
7 it would be gone three weeks later.

8 And we can probably assume, given  
9 the quality of the health physicists who were  
10 actually operating at Brookhaven, that any  
11 policy, like the one Grady referred to, that  
12 anyone who was likely to have more than ten  
13 percent of allowable, was going to be  
14 monitored.

15 We could probably assume the  
16 monitoring did occur, because of the quality  
17 of the health physics that you had there.

18 But, with respect to whether you  
19 have missing records, that's going to be very  
20 difficult, I would think, if you identify the  
21 missing record to tie that to the fact that  
22 the reason it's missing is because nothing was

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1 going on at the time and therefore the  
2 monitoring is not taking place.

3 MR. FITZGERALD: Yes, it's not easy.

4 MEMBER MUNN: No, it isn't easy.

5 MR. FITZGERALD: It isn't easy and  
6 that's the feedback I think we received from  
7 staff.

8 MEMBER MUNN: It's unlike pointing  
9 to gaps in information that may occur in an  
10 operating facility, it's totally different.

11 MR. FITZGERALD: Yes, and the  
12 circumstances -- you're doing a retrospective  
13 centralization of records over decades. And,  
14 you know, in a research lab, if you didn't  
15 centralize those records when they were  
16 created, the challenge is that there is no way  
17 to ensure that those records are going to be -  
18 -

19 MEMBER MUNN: Well, even if you're  
20 centralizing the badge records, even if you're  
21 centralizing the information that we're  
22 looking at, without a direct tie to the

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1 operational records and to the research  
2 records, it's not easily identifiable, why?

3           You may think something is missing,  
4 when the reason it's missing is because  
5 nothing was happening.

6           MR. FITZGERALD: Right. Well,  
7 again, I think everybody, I think there's no  
8 disagreement that, you know, the circumstances  
9 behind the program were challenging. I think  
10 we're just trying to figure out, you know, at  
11 what point was the corner turned in the  
12 context of this program with dose  
13 reconstruction.

14           We have doubts about 1980. Now, we  
15 don't have a clear idea either whether it's  
16 '85, '86, you know, it's just one of these  
17 things where, until they were certified, which  
18 I think was late '90s.

19           DR. BUCHANAN: '99.

20           MR. FITZGERALD: For internal. They  
21 were certified for internal in '99, and  
22 external, I think was '92. You know, there's

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1 a gray area there that I think we'll need, you  
2 know, need some validation. Something that  
3 gives confidence that the records are in fact  
4 reliable enough.

5 And I think that process, it seems  
6 like it's just starting in the sense the ER  
7 didn't provide, I think, what I would look for  
8 in the way of validation itself. The follow-  
9 up on the implementation memos, the actual,  
10 you know, actual retrievability tests, maybe  
11 some mapping of what records were available.

12 I think that's what's going to be  
13 necessary to know, you know, whether or not we  
14 truly have something that we can have  
15 confidence in, in terms of dose  
16 reconstruction.

17 I think before that you have  
18 programmatic intent. You have steps  
19 beginning, but it's not clear if those steps  
20 led to something that is solid. And that's  
21 the concern that we have.

22 MEMBER ANDERSON: One source of

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1 information is that cases that are, or have  
2 been reviewed or are under review and how many  
3 of these have been closed? If you have 200,  
4 are they sitting there, because somebody  
5 hasn't been able to recapture records at some  
6 point?

7 MR. CALHOUN: Let me tell you, I  
8 want to say there was 145 total cases, total  
9 that was sent to us from the Department of  
10 Labor. And I would guess, if it's typical  
11 that, you know, at least 30 percent of those  
12 have been taken for SEC.

13 But let's, hold on a second, let me  
14 look. One hundred fifty-three total cases  
15 were submitted, 34 have been pulled for SEC  
16 purposes, 61 remain active.

17 DR. BUCHANAN: What were those  
18 numbers again, please?

19 MR. CALHOUN: One hundred fifty-  
20 three total.

21 DR. BUCHANAN: Okay.

22 MR. CALHOUN: Thirty-four pulled for

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1 SEC, 61 remain active. Fifty-eight were  
2 completed.

3 MEMBER MUNN: Fifty-eight closed.

4 MR. CALHOUN: And a little bit more  
5 than 33 percent of those were comped. Now I  
6 can't -- some of these undoubtedly are mixed  
7 employment. I can't tell that from looking at  
8 this. They may have worked somewhere other  
9 than Brookhaven.

10 DR. BUCHANAN: Fifty-eight of the  
11 DRs have been completed?

12 MR. CALHOUN: Correct.

13 MEMBER ROESSLER: And how many,  
14 that's 30 some comped?

15 MR. CALHOUN: Thirty-three percent,  
16 about. It's about a little bit more than a  
17 third.

18 MEMBER ROESSLER: And then you  
19 started to say based on?

20 MR. CALHOUN: Just based on dose  
21 reconstruction.

22 MEMBER ROESSLER: Do you recall what

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1 working conditions were that, I'm trying to  
2 think of the whole spectrum of workers and,  
3 you know, things that these are going to be  
4 words that will get people going.

5 But things like bounding and cohort  
6 data and that sort of thing, when you're doing  
7 dose reconstruction, is that an option then  
8 beyond what we're talking about?

9 MR. CALHOUN: Right now our dose  
10 reconstructions are based on the internal and  
11 external dosimetry records. If they weren't  
12 monitored internally or externally, we go by  
13 environmental dose.

14 DR. MAURO: Okay, that was the issue  
15 I wanted to get to. In classic SEC ER review,  
16 what we do is we break the site up into time  
17 and operation.

18 And that's typically an operating  
19 facility. Here I recognize we have a very  
20 different kind of situation. And what we look  
21 at is, okay, for this particular time period,  
22 this particular campaign or operation or

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1 research activity, how many records do you  
2 have -- let's say it's whole body count. And  
3 we ask that question because we ask ourselves,  
4 are they in a position to create a coworker  
5 model? Because very often you find there  
6 might be a worker that, if you have 100  
7 percent records, from the workers that worked  
8 in that box, you don't need a coworker model.  
9 But, it's very rare that that occurs. Then we  
10 ask ourselves, do you have the records to  
11 build a coworker model? And my question to  
12 you is, have you found that you had to build a  
13 coworker model?

14 MR. CALHOUN: We have not undertaken  
15 that yet.

16 DR. MAURO: It hasn't happened yet.

17 MR. CALHOUN: No.

18 DR. MAURO: Now, do you feel as if  
19 that, given the limitations that you had on,  
20 see, in the end, if you can't build a coworker  
21 model for a given claim, but you feel that  
22 this person did experience an internal

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1 exposure, for that box there's an SEC.

2 MR. CALHOUN: Right, right.

3 DR. MAURO: And I guess that goes to  
4 the heart of it.

5 MR. CALHOUN: Right, right. I can't  
6 imagine that we won't do that, but right now  
7 that's not something we've done.

8 You know the internal exposure  
9 potential was pretty minor, at that site,  
10 especially later in the years. I actually  
11 found a Tiger Team report that was done in  
12 1990, that reported that as such, that the  
13 internal exposure potential was minor at the  
14 Brookhaven Site. And that's rare that the  
15 Tiger Team would ever say anything like that,  
16 right, Joe?

17 (Laughter.)

18 MEMBER ANDERSON: So some of the  
19 cases that were filed you found no  
20 biomonitoring data?

21 MR. CALHOUN: Correct.

22 MEMBER ANDERSON: And therefore you

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1 assigned environmental.

2 MR. CALHOUN: Correct.

3 MEMBER ANDERSON: But in looking at  
4 those do you have any sense of, would you  
5 expected there to have been -- I mean were  
6 they in jobs where they might have been --

7 MR. CALHOUN: Typically we do. I  
8 can't answer you on all these, but likely  
9 that's part, when we do a review. If somebody  
10 was a health physics technician and didn't get  
11 internal monitoring, we would throw the flag  
12 on that. You can't just assign them to  
13 environmental.

14 MEMBER ANDERSON: Well, that's why  
15 I'm just, for getting a sense on the  
16 completeness.

17 MR. CALHOUN: Right.

18 MEMBER ANDERSON: The records, the  
19 ones to focus on --

20 MR. CALHOUN: Especially, yes --

21 MEMBER ANDERSON: Are not the ones  
22 where you found the records, but if there are

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1 some here and you, there was a reasonable  
2 expectation they should have been monitored.

3 MR. CALHOUN: That's the issue of  
4 the coworker model, that we might have to go  
5 down that road.

6 DR. BUCHANAN: You don't know how  
7 many of those completed had bioassay data  
8 available?

9 MR. CALHOUN: I can't tell you off  
10 the top of my head, I can find that out. Yes,  
11 but that's changed.

12 MR. ADLER: Right, that's changed.

13 MR. CALHOUN: That's increased,  
14 because of the re-request that we've done.  
15 The amount of bioassay and X-ray data that we  
16 got has gone up.

17 MEMBER MUNN: But, in any case, as  
18 long as we have data that we're working on,  
19 the issue of coworker and that type of  
20 calculation is speculating what might come up  
21 in the future, not what's come up in the past.

22 MR. CALHOUN: Right, right.

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1                   MEMBER MUNN: So, we're not dealing  
2 with that right now.

3                   MR. CALHOUN: Right.

4                   MR. FITZGERALD: Ron, do you want to  
5 just walk through the Matrix. I kind of gave  
6 probably most of it, but just to capture that  
7 issue in more detail and the neutrons.

8                   MEMBER ANDERSON: The neutrons are  
9 the second issue.

10                  MR. FITZGERALD: Right.

11                  DR. BUCHANAN: Okay. On the  
12 internal monitoring, our review of the ER, I  
13 think most of you have probably received that.  
14 And what we tried to do was, okay, first of  
15 all, SC&A, in reviewing Brookhaven, really at  
16 this point has no problem with the health  
17 physics practices that we see at this site.

18                  There were some top-notch health  
19 physicists there and we don't doubt that  
20 generally samples were taken when they needed  
21 to be. They had the equipment to do it,  
22 probably.

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1           It was a little surprising they  
2           used NTA film up to 1995. But, be that as it  
3           may, I would like to just give a little bit of  
4           clarification to things, some things they  
5           discussed at the table, and see where we're  
6           at, at this point.

7           You know, where are we at? And  
8           perhaps it will guide us to where we need to  
9           go. The external dosimetry was recorded  
10          fairly well in their files.

11          We really did not see a problem  
12          with the external dosimetry records. They  
13          were handwritten up through '95, and if I'm  
14          wrong on any of these, you can correct me,  
15          this is what I've gathered.

16          And then in '95, they went to the  
17          HPRS electronic database for external  
18          dosimetry. And then, so that's the system  
19          they use today, the HPRS, Health Physics  
20          Record System. And so those are available.

21          Now when we get into the neutron  
22          here, we see that Landauer actually did the

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1 record keeping out of Dosimetry Processing and  
2 Record Keeping from '85, to '95/'96, in that  
3 area.

4 And they have the tritium data,  
5 because at that time it was considered a whole  
6 body dose, and so they have the tritium data  
7 on record there.

8 Now the internal dosimetry records,  
9 just to cover that briefly again, is that you  
10 had kind of, at this research facility, you  
11 had kind of, I call them empires.

12 People controlled their own areas  
13 of interest. There was reactor, accelerator,  
14 whatever, and they determined what health  
15 physics needed to be done and then kept the  
16 records locally there, in a lot of cases.

17 The medical facility started out  
18 the whole body counting for medical reasons.  
19 They had a medical research reactor there and  
20 they had the whole body counter.

21 And then you had your Marshall  
22 Islands, nuclear weapons testing, that whole

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1 body counter went back and forth. So the  
2 records were, as we've talked about,  
3 scattered.

4 And then in the '90s, I think, they  
5 started using some electronic databases. Some  
6 of the departments had electronic databases  
7 and they were certified for, they did the  
8 DOELAP Accreditation in 1999, for *in vivo*  
9 counting.

10 So this kind of gives you a  
11 milestone, stake in the ground, 1980 to 1999,  
12 is the area that we are concerned with. Now  
13 you really don't have proof, I guess, that the  
14 internal records appeared on the HPRS until  
15 2002.

16 That's when it was mandated that it  
17 be -- that it go over to that. So, we assume  
18 if it was accredited in 1999, they must have  
19 had some sort of data or recordkeeping system,  
20 but I still have a question, and this is just  
21 some areas that I'm dragging in, because I  
22 don't feel that this has been answered as what

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1 1980, through 2001, where are those records at  
2 and are they retrieved.

3           When the DR sits down at his desk  
4 in Oak Ridge or in Cincinnati or wherever he's  
5 located and does a dose reconstruction, what  
6 is the process and where is that data attained  
7 from to do that dose reconstruction?

8           We know that there's the personnel  
9 file, there's the medical records, there's the  
10 HPRS, and there's this other file that's being  
11 knit together to bring some of this together.

12           There's some old electronic  
13 databases. Are they sitting in a basement  
14 someplace or are they operational or what?

15           So, that's just some gray areas  
16 that I feel that needs to be addressed. Where  
17 is this data actually stored and how is it  
18 retrieved?

19           And so we, that's a little overall  
20 picture of where I'm at, anyway, and I guess  
21 on the internal bioassay data at Brookhaven.

22           And so what we wanted to look at

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1 was the 1980 turning point and see when this  
2 might have come into effect. And that we've  
3 discussed some this morning.

4 And so, what I did, is I did a two-  
5 pronged check on it. Number one, I looked at  
6 the documents that were quoted to see if there  
7 was an indication that records were going to  
8 be improved and did they follow through with  
9 it.

10 And then I looked at the data and I  
11 agree that it isn't conclusive. I just, NIOSH  
12 had done a very good job of capturing a lot of  
13 data, did it in tabular form in the ER.

14 Myself, I like to see a picture.  
15 And so I took the tabular form and put it into  
16 plots to see if there wasn't any case, I'm not  
17 saying it's proof one way or the other.

18 But if I would have seen a change  
19 in the bioassay data, then that would have  
20 been a good indication. You know, rather an  
21 increase, decrease or maintenance  
22 stabilization or whatever.

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1                   And I realize that this is  
2 complicated by the fact that it's a research  
3 facility, projects start and stop and that  
4 sort of thing.

5                   But if there would have some,  
6 eureka, you know, wow, that does look like a  
7 change, maybe we could have seen a turning  
8 point.

9                   And so that's the two-pronged  
10 attack I took. And so in my review of the ER,  
11 first of all, I'll talk about the  
12 documentation. And as NIOSH has stated, that  
13 there was indication that this was to be done  
14 in '79, by Hall and Cohen.

15                   So I looked at those documents that  
16 are available and I'd like to read the first  
17 reference, Hall, 1979. It says the principal  
18 weakness of our program are suggested by this  
19 canvass of general practices or the lack of  
20 required initial counts for persons newly  
21 nominated to the list and/or a final count for  
22 terminals, termination from it.

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1                   But it is not apparent. I am also  
2 aware that our current program does not  
3 specifically provide the diagnostics or the  
4 follow-up for positives disclosed either by  
5 routine or special body counts.

6                   Although the above could probably  
7 be accomplished within our current arrangement  
8 with the medical department, which had the  
9 whole body count at that time, I feel that  
10 there are strong reasons we should assume the  
11 program is 100 percent S&EP operation, now  
12 that we have the ability to do so.

13                   Now, that's reading directly from  
14 his memo, Hall 1979. And I see in it that  
15 they want this to take over the routine  
16 counting for the workers, not the bioresearch,  
17 not the medical research, but for the routine  
18 workers and such.                   And set up their  
19 own body counting and such there. I don't see  
20 an emphasis on recordkeeping and there's  
21 nothing said about records here.

22                   Now, intuitively, you'd say, well,

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1 if they're going to centralize the whole body  
2 counting then, now they should probably mean  
3 to keep the records.

4 But I do not see anything  
5 specifically that emphasizes, hey, we've got a  
6 problem with records here. They're scattered  
7 all over. We're going to centralize it so  
8 that they're in one place.

9 Now, the second reference, Cohen  
10 1980, is very short and I'll read the whole  
11 memo. The medical whole body counter is  
12 always available for monitoring for BNL  
13 personnel in emergency situations, as you are  
14 aware.

15 Apparently, this statement is  
16 written from the medical group to the S&EP  
17 group, when they talked about the whole body  
18 counter being centralized.

19 In response to your programmatic  
20 needs in relationship to medical isotope  
21 research and production, we will make every  
22 effort to accommodate you for interim

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1 services, availability of the counter for  
2 routine monitoring of personnel, of course  
3 subject to clinical research demands made on  
4 the counter.

5 I assume that you will be --  
6 continue to be responsible for the analysis  
7 and interpretation of the whole body counting  
8 data obtained during this interim service  
9 period.

10 And so apparently the Cohen 1980  
11 memo was from the medical department to the  
12 S&EP department saying, okay, you're going to  
13 take over the whole body counting, that's  
14 fine.

15 We'll be available when it's gone  
16 to the Marshall Islands to do routine counting  
17 if the time is available, of course, our  
18 medical research takes first place on the use  
19 of it.

20 And this was from the -- they had a  
21 medical research reactor there. Now, a  
22 related Hall, 1978 article, mainly emphasizes

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1 the technical, personnel and budget issues  
2 associated with him taking over the whole body  
3 counting responsibility for routine  
4 monitoring.

5 So reading the memos in detail, I  
6 see an intent for S&EP to take over the whole  
7 routine whole body counting with the medical  
8 facility as a standby in case they needed it.

9 I did not really see intent or a  
10 path forward laid out concerned with record  
11 keeping in those memos. I guess you could  
12 read into it, but I didn't see anything that  
13 really stated that in those.

14 That was the first prong I looked  
15 at. The second prong was the bioassay data.  
16 And, again, the bioassay data was, there's a  
17 lot of it and if you look at all the tables,  
18 it's probably, it's confusing, but there is a  
19 lot of information there.

20 Now whether we can use it to show  
21 what they think has changed, I don't know.  
22 And that's what I wanted to look at. And

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1 that's why I did the plotting.

2 I simply took the tabular data, put  
3 it into an Excel spreadsheet and did plots on  
4 it. And I included those in the report, in  
5 our review of the ER.

6 And do you have, most people have  
7 that or do you not have that in front of you?

8 CHAIR BEACH: I have it. Anybody  
9 else?

10 MR. CALHOUN: We're looking at ER?

11 DR. BUCHANAN: No, no, SC&A's  
12 response to the ER, dated July 1st, 2010.  
13 That was a revision. There was an earlier one  
14 that came out without the plots, before I had  
15 all the data.

16 CHAIR BEACH: What page are you  
17 looking at?

18 MR. FITZGERALD: I have an extra  
19 copy, does someone need it?

20 MEMBER ROESSLER: Yes, I don't -- I  
21 can't find one right offhand.

22 DR. BUCHANAN: I won't go into

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1 detail, I was just, in case people had  
2 questions on it, had looked at it. But just  
3 to show what the intent was.

4 What I did is take the data, plot  
5 it, and try to look at if there was a positive  
6 indication. I mean, I was, my mind wasn't  
7 made up one way or the other.

8 I just wanted to see if there's  
9 some indication, 1980 was the period that we  
10 could hang a hat on.

11 And Figure 1 and 2, I took the  
12 data, plotted the information captured by  
13 NIOSH and plotted this information and then  
14 drew a line at 1980.

15 What I did, I tried to go both  
16 sides of 1980, say ten years before, ten years  
17 after. Or 20 years before, 20 years after,  
18 and look and see if there was a pivot point at  
19 1980.

20 Figure 1 and 2, I did not see, you  
21 know, a large indication. I see an increase  
22 in Figure 2, when the whole body count came

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1 in.

2 This is a complicating factor, is  
3 that in 1980, the whole body counter came into  
4 use on a more routine basis. It came in  
5 earlier than that, but not so much as routine.

6 They started in the '60s, did some  
7 in the '70s, and then 1980s they kind of came  
8 in with a whole body counter that replaced a  
9 lot of the time-consuming costly bioassay, you  
10 know, urinalysis.

11 But, and I think that we agree with  
12 that, but the fact is the presence of the  
13 technology and the use of it, doesn't mean  
14 that we have the records for it.

15 And so, that's what I was looking  
16 at, is the records showing an indication of  
17 something happening in 1980.

18 While there was an increase in  
19 whole body count, unfortunately it came about,  
20 about 1980s, but it doesn't really drive a  
21 nail in the wall there saying that that was a  
22 date that is important.

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1                   And it made quite a bit of  
2 fluctuation in the whole body counting in  
3 Figure 2, there, did this really tell us  
4 anything?

5                   Well, it didn't really tell me one  
6 way or the other that 1980 was a pivot point.

7                   Now, Figure 3, I guess this is the only one  
8 that looks like, you know, is positive in that  
9 1980 was a point.

10                  Now, however, 1973 to 1979, Figure  
11 3 there, from '73 to '79, just to give some  
12 numbers to this, we see in '73 to '79, this is  
13 69 people scattered over this period of time  
14 that they requested bioassay for.

15                  Now this is somewhat different than  
16 routine bioassay. They requested, is that  
17 right, this was a special request? Joe needs  
18 this bioassay, okay, as opposed to routine  
19 bioassay.

20                  MR. CALHOUN: That was more likely  
21 the case.

22                  DR. BUCHANAN: So this is special

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1 requests.

2 MR. CALHOUN: Or this group of  
3 people from this particular facility.

4 DR. BUCHANAN: Okay, so, it's kind  
5 of, you know, these need it now, go do it.  
6 And then Grady looked at how many of them was  
7 completed.

8 Okay, for these 69 workers,  
9 straight over from '40 -- I guess 1950 to  
10 1992. We see that there was very little  
11 compliance before '73.

12 '73 to '79, are 75 percent  
13 compliance. '80 to '89, there was 92 or  
14 essentially 100 percent, if you count the  
15 later one found, and in '92, there was 100  
16 percent compliance.

17 Now this was, the numbers were  
18 about 11 to 16 per bar there, and for example,  
19 1958, two records were found out of 11  
20 requested.

21 So that was 18 percent. '73 to  
22 '79, you had 12 out of 16, which is 75

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1 percent. And then in '80 to '89, you had 12  
2 out of 13, which was 92 percent.

3 Well, there's a pretty good  
4 increase in the '70s, really. And then  
5 between '79 and '89, there, there's not a  
6 whole lot of difference.

7 In '92, for these special requests  
8 it was 100 percent. That was 11 out of 11 in  
9 '92. So, you know, you can draw your own  
10 conclusions.

11 It looked like there was a turning  
12 point in '80, maybe some for special request,  
13 it looked like they filled the bill better and  
14 you can retrieve, the work was done and you  
15 could retrieve the data. Some were starting  
16 in the '70s.

17 MR. CALHOUN: Now just let me  
18 interject something here. I believe that --  
19 you're calling these special requests. I  
20 believe that's how it was done.

21 You know, I don't think that these,  
22 there weren't a big group of routines, you

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1 know. This is how it was done. So, saying  
2 routine or special request, I don't think it's  
3 much different than how all of it was done.

4 Because what you'll see is these  
5 requests that say these guys need to be  
6 monitored. Not because of an incident, but  
7 because of their job.

8 So I don't think these were special  
9 requests, I think this is just how it was  
10 done. Because everybody is not monitored.  
11 This is how I discerned who should be.

12 MEMBER ROESSLER: Now let me pick up  
13 on that because I think back, and I can't  
14 remember the years we did this, but when you  
15 say special request, I can think of a lot of  
16 times, and I was in charge of a whole body  
17 counter.

18 We were doing, not just monitoring,  
19 but we were doing cesium-137, that was  
20 fallout. That had nothing to do with the work  
21 environment. And I think, and I see where  
22 you're going on this but, to me, a question

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1 that would have to be answered would be why  
2 were they doing these counts and were a lot of  
3 them because of cesium?

4 I don't know whether you looked at  
5 that. I don't -- Brookhaven did, I think, a  
6 lot of cesium studies. That has nothing to do  
7 with worker monitoring. I think we just need  
8 to look more into it.

9 MR. CALHOUN: Right, but the folks  
10 that were working at the reactors, you know,  
11 the cesium certainly would be a good indicator  
12 for them.

13 So a lot of people that you'll see  
14 that were monitored for whole body count would  
15 be from the HFBR, the High Flux Beam Reactor.

16 MEMBER ANDERSON: So, in these 69,  
17 is this just there were some biomonitor or  
18 some data, or did you look and see that they  
19 had complete records?

20 MR. CALHOUN: I'm sorry, 1969?

21 MEMBER ANDERSON: No, no, I mean of  
22 these 69 people, is it just yes, they had

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1       some?

2                   MR. CALHOUN: There was a request --

3                   MEMBER ANDERSON: A record --

4                   MR. CALHOUN: Yes.

5                   MEMBER ANDERSON: Of a test versus -

6       -

7                   (Simultaneous speaking.)

8                   MR. CALHOUN: That was done, it was  
9       done because it was requested, okay? So it's  
10      not if they had some, if they were asked to  
11      get a whole body count in 1979, we had to see  
12      a whole body count in 1979, before we checked  
13      that box.

14                  MEMBER ANDERSON: Okay.

15                  MR. CALHOUN: Okay. It wasn't just  
16      anything. It had to be --

17                  MEMBER ANDERSON: You didn't look at  
18      the whole work history?

19                  MR. CALHOUN: It had to be -- no,  
20      because that wouldn't help us on  
21      retrievability for those records. We were  
22      trying to isolate it.

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1                   If you were told to get a count,  
2                   did you get it, do we got it.

3                   MR. KATZ: Can I just say something.

4                   It's difficult if you talk over each other,  
5                   so please try to speak separately, like Andy  
6                   and Grady just now.

7                   MR. CALHOUN: I'm sorry, it was our  
8                   passion.

9                   MR. KATZ: But Ben here is trying to  
10                  transcribe and it's murder.

11                  MR. ADLER: I just want to reiterate  
12                  what Grady said is correct. I think it would  
13                  be more proper to view these as requests.  
14                  That is the way it was done and we have dozens  
15                  of memos with these sorts of requests.

16                  We pulled out, we tried to pull out  
17                  ten or so per decade, because of the time we  
18                  figured we had left to completely search out  
19                  and see if these requests were fulfilled, but  
20                  there are many more such memos.

21                  And it just seems to be, that's how  
22                  they document, it wasn't a routine program, I

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1 want this person sampled, I'm documenting,  
2 please get this person sampled.

3 MEMBER CLAWSON: So there wasn't an  
4 established bioassay program or whole body  
5 count program?

6 MR. ADLER: It's not cut and dried,  
7 but in general, these things were done by  
8 request on an as needed basis.

9 MR. CALHOUN: But the program was  
10 the people that had the potential to exceed  
11 ten percent of the allowed limit --

12 MR. ADLER: Right.

13 MR. CALHOUN: Or whatever the limit  
14 was, be monitored. And then someone had to  
15 make that call, and that was done on a  
16 project-specific basis.

17 MEMBER CLAWSON: I understand that,  
18 I'm just trying to figure out, we have  
19 projects come in, we have, just like Wanda  
20 said, projects go out and how this changes.

21 And people also change into it.  
22 I'm just wondering how the program, you know,

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1 worked to be able to make sure they were  
2 captured, make sure that they were there.

3 MR. CALHOUN: But interestingly,  
4 like a couple of the folks have said around  
5 here, there hasn't been a whole lot of  
6 question of the quality of the program, as far  
7 as who was monitored and should they have been  
8 monitored.

9 Again, I hate to point out a Tiger  
10 Team finding, but that was another finding of  
11 that 1990 Tiger Team finding, is that people,  
12 they were monitored internally and externally  
13 and it was appropriate.

14 I'm sure there's some findings in  
15 that Tiger Team document, but that was very  
16 surprising, too. And you know what they hung  
17 their hat on, was the quality of the people,  
18 like you said, there's some very notable  
19 health physicists in the records.

20 DR. MAURO: There's a premise that  
21 we're operating on here, which is I think  
22 interesting. And it goes to the point you

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1 just made, Brad.

2 That is, so there wasn't really a  
3 routine program and there was a judgment that  
4 there was no need for a routine program.

5 And the judgments regarding when a  
6 bioassay or a whole chest count or a whole  
7 body count was needed, was triggered by the  
8 manager or the principal investigator making a  
9 request.

10 So what we're operating within is a  
11 framework where processes, when that request  
12 is made, it's made for good reason, the  
13 measurements are made, can we retrieve the  
14 data?

15 If we can do that, we're in good  
16 shape. And right now you're saying it looks  
17 like we're starting to be able to retrieve  
18 that data, when it's needed, beginning in the  
19 '80s, it's starting to look a little better.

20 Okay, now, so everything hinges on  
21 the wisdom of the person who makes the  
22 judgment that I think we need to measure this

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1 person. Now, and everyone else that's not  
2 measured, the premise is there was no need to  
3 do one because of this judgment that was made.

4 Now, my question is that it would  
5 be nice to say, at that operation, at that  
6 facility, there were continuous air monitors  
7 that were in place, that were routinely  
8 sampled, you know, and counted. And that  
9 there's evidence that the judgment was correct  
10 because, not only -- because right now we're  
11 just saying, listen, we have to trust this  
12 guy, he's a smart guy.

13 And he knows when to call for one  
14 and when not to call for one. And I believe  
15 that may very well be true. What would be  
16 very encouraging is if along with that, there  
17 was some air sampling records that  
18 demonstrated that that general working  
19 environment for that period, at whatever that  
20 location was and activity, had some continuous  
21 air monitoring, which are always negative.

22 And that coupled up with being able

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1 to retrieve the records from when a judgment  
2 was made, is some -- it would be assurance  
3 that not having a routine, monthly, quarterly  
4 chest count, bioassay sample was appropriate.

5 Because there was no evidence that  
6 there was a problem. Have you folks tried to  
7 run down --

8 MR. CALHOUN: I don't know that off  
9 the top of my head.

10 DR. MAURO: Okay.

11 MR. CALHOUN: I know that we -- you  
12 know, there's plenty of environmental samples,  
13 but that's not what you're talking about.

14 DR. MAURO: No.

15 MR. CALHOUN: And, you know, the  
16 Accelerator facilities are not going to pose  
17 much of an internal hazard. So you're  
18 primarily looking at the operational reactors  
19 there, HFBR and such.

20 So, I don't know. I haven't looked  
21 at that recently. I think that, you know, I  
22 certainly can search the SRDB to see what's

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1       there, and even though, again I'll fall back  
2       on one of the, one of the Tiger Team findings  
3       was that the internal dose, and that internal  
4       radioactivity at Brookhaven is a minor  
5       concern.

6                       MEMBER MUNN: But, John, if you  
7       don't have individuals who were monitored,  
8       showing high bioassay results, then why would  
9       air monitoring be an issue?

10                      If you have bioassays that, it  
11       doesn't, it sounds like gilding the lily.

12                      DR. MAURO: Well, I guess I'll put  
13       it another way. There's an operation set up,  
14       experiment or whatever it is that's being  
15       done.

16                      A judgment is made, okay, what type  
17       of health physics coverage is needed here? Do  
18       we need, if I was the person in charge, let's  
19       say, I would ask myself that question.

20                      And, for example, it's a reactor,  
21       and there's a potential for some airborne  
22       radioactivity under some unusual transient.

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1 We want to have a continuous air monitor to  
2 alert you to that circumstance.

3 And now, and then the person who's  
4 running that program, obviously makes a  
5 judgment when, I think it's a good idea, we  
6 better have a whole body count of John Doe, at  
7 a given point in time.

8 And he made that judgment based on  
9 something. Something happened. Now, I agree  
10 with you, let's say every time that judgment  
11 is made, and they make it, and they perform  
12 the whole body count or they take a urine  
13 sample, and it comes back negative every time.

14 It means that that was just  
15 precautionary and that will be some evidence  
16 that there really was no significant airborne  
17 problem at the facility, ever.

18 Or at least that particular  
19 facility --

20 MEMBER MUNN: Not during that --

21 DR. MAURO: Not during that period  
22 of that operation. See, I'm looking for, I'm

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1 looking for that other piece of information  
2 that confirms that the judgments that were  
3 made for who should be counted when, was, in  
4 fact, a wise decision and was cautionary.

5 MEMBER MUNN: Well, you know that  
6 counts and bioassays are certainly going to be  
7 made if there's any incident.

8 DR. MAURO: Yes.

9 MEMBER MUNN: And if you have no  
10 incident reports and you have no bioassay or  
11 internal or whole body count from any of the  
12 people that are monitored, that indicates that  
13 there's a high --

14 DR. MAURO: I agree with that, too.  
15 See, that would be another dimension. In  
16 other words, that would be another piece of  
17 evidence that would help us feel confident  
18 that everything was under control.

19 So that, in other words, the fact  
20 that maybe the results that do come back are  
21 negative. Two, the fact that there are no  
22 incident reports. Three, there may have been

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1 continuous air monitors in place, collecting  
2 data continuously and they were all negative.

3 You start to put all that together  
4 and all of a sudden you say, you know, there's  
5 good reason why they did not have a  
6 continuous, a monthly, a quarterly bioassay  
7 program.

8 And they only triggered it when the  
9 judgment was made prudently that maybe we  
10 better measure it.

11 And that would, see, we will, for  
12 the first half of this meeting, we were  
13 talking about retrieving the records for  
14 people that a request was made for a whole  
15 body count.

16 And I think we're moving in the  
17 direction where it looks like that being able  
18 the retrieve those records certainly started  
19 to improve in the '80s, okay?

20 But there's a premise we're  
21 operating on that, okay, great. And if we can  
22 show that, then everything is fine. But I

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1 say, well, I'm not ready to give that up yet.

2 I want another, one more thing.  
3 That, that -- retrieving that record is only  
4 one part of the problem. The other part is  
5 that the fact that there was not a routine  
6 whole body counting program or bioassay  
7 program, was probably okay.

8 And the reason is, the kinds of  
9 things you just said. There were no incident  
10 reports. There may have been continuous air  
11 monitors confirming that there really wasn't a  
12 problem.

13 And evidence that when we did whole  
14 body count these people or bioassayed them, we  
15 got negative results. See, that would be the  
16 part of the story that closes the loop for me.

17 Yet, somehow that was in the  
18 loophole. That's how I'm thinking about it.

19 MR. ADLER: We have a brief  
20 mentioning of air monitoring data that we did  
21 capture examples of air monitoring data that  
22 are in the SRDB and that we got through data

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1 capture process.

2 So, it would be ridiculous to say  
3 that we have a complete set of all the air  
4 monitoring data, because through the data  
5 capture process we might always miss things,  
6 but there are examples.

7 DR. MAURO: And there may be  
8 something in the record that says that, not  
9 setting up a continuous air monitoring program  
10 for this facility at this time, there was some  
11 thought given to that, why it was not  
12 necessary.

13 Or some thought given to the fact  
14 that we don't really expect there to be any  
15 airborne activity. In other words, I believe  
16 that all the people around this program were  
17 the top notch people.

18 So they must, so this thought,  
19 deliberation, if I were there, I would have,  
20 you know, somehow thought about that. To make  
21 sure that I'm covered. And that's the part of  
22 the story that I guess I haven't heard.

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1                   That, you know, that the people  
2                   that were running it were thoughtful about,  
3                   listen, we don't need to do this, but we do  
4                   need to do this.

5                   Right now I think that we limited  
6                   our discussion to when a decision was made to  
7                   have a whole body count, and we want to go and  
8                   make sure we can retrieve that data.

9                   But, in my mind, that's great. But  
10                  it's not complete. There's a little bit more  
11                  to the story I'd like to hear.

12                  CHAIR BEACH: So, before we do that,  
13                  can I jump in and say, let's go ahead and take  
14                  a break. Okay, so ten minutes.

15                  MR. KATZ: Okay, so about 20 of, 20  
16                  of 10:00 we'll start. I'm just going to put  
17                  the phone on mute.

18                  (Whereupon, the above-entitled  
19                  matter went off the record at 9:31 a.m. and  
20                  resumed at 9:42 a.m.)

21                  MR. KATZ: Okay, we're reconvening  
22                  after a short break. This is the Brookhaven

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1 Work Group.

2 CHAIR BEACH: Okay, we're continuing  
3 on with the internal discussion. I just want  
4 to remind everybody that this meeting does end  
5 at 12:00. So, just a friendly reminder that  
6 we still have several things to go through.

7 So, Ron, if you want to take up  
8 where we left off.

9 DR. BUCHANAN: Okay, we were  
10 discussing Page 11, Figure 3, the requested  
11 bioassay and how well they were filled. We  
12 found out they started filling them in the  
13 '70s and '80s and had a pretty good record in  
14 the '90s.

15 And now there was, is something I'd  
16 like to get clarified, is that in my mind I  
17 had that the reactors, especially like the  
18 older graphite reactor, research reactor and  
19 the high flux reactor and the medical reactor  
20 and the isotope production facilities, I would  
21 assume that they were on a routine bioassay of  
22 some sort.

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1                   Now, is this not right, Grady, in  
2                   what you found?

3                   MR. CALHOUN: I would, from what  
4                   I've seen and I didn't focus a lot on the  
5                   stuff that was post-1980, or pre-1980, but if  
6                   you look at some of the memos that I've seen,  
7                   it appears that big chunks of like HFBR, high  
8                   flux beam reactor, were on bioassay.

9                   But those were, again, requested by  
10                  a memo. You know, there may be 25 people in  
11                  there that say these guys need to have whole  
12                  body count.

13                  DR. BUCHANAN: So they did not have  
14                  operators and such, I think the graphite  
15                  reactor they did that routine, but in later  
16                  years you did not find that they --

17                  MR. CALHOUN: I didn't see a memo  
18                  that says everybody from the high flux beam  
19                  reactor needs to have a bioassay every month  
20                  and a whole body count every year.

21                  DR. BUCHANAN: Okay. In any of the  
22                  dose reconstruction, I don't know if you

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1 looked at this detail. Did you find anybody  
2 that had routine bioassays or were they  
3 sporadic?

4 MR. CALHOUN: Typically, what you'll  
5 find with whole body count is you'll get the  
6 current whole body count and then there's a  
7 column that says last counted.

8 So I'll get at least two, you know,  
9 if they, when their last count was. If you  
10 look through, there's certainly routine  
11 tritium samples that were taken of people,  
12 tritium bioassay were taken.

13 Uranium bioassay, I, at least the  
14 ones that I've looked at, as a part of this, I  
15 don't see any that were monthly or semi-  
16 annually or anything like that, you know.

17 And the whole body counts were  
18 typically annually or semi-annually.

19 DR. BUCHANAN: And now the tritium  
20 bioassay, though, I would assume that would  
21 have been a set schedule.

22 MR. CALHOUN: I would imagine, by

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1 looking at the records, there were usually the  
2 people who were monitored for tritium had --  
3 usually.

4 And, again, I think that was more  
5 in the earlier years, then in 1980 there was a  
6 bunch more.

7 DR. BUCHANAN: Okay, they, now  
8 Figure 4 and 5, are some plots of data. Just  
9 trying again to see if there was any  
10 information here that showed 1980 was a  
11 turning point.

12 From the information I gathered,  
13 you know, there was no obvious turning point  
14 there. You can see that whole body counting  
15 increased. Tritium analysis fluctuated and  
16 somewhat depend on the operations going on.

17 However, I think when the reactor  
18 was shut down, they still had tritium, in fact  
19 a lot of facilities when things were shut down  
20 you had more bioassays than you do in  
21 operation, if you're doing maintenance and  
22 that sort of thing. So, really, it was kind of

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1 inconclusive, not an obvious point either  
2 towards, not towards 1980.

3 Now Figure 6, 7 and 8, was some  
4 data that NIOSH had gathered for 200 people.  
5 And it showed where the data was located in  
6 the three major databases, the index files,  
7 the personnel monitoring file, the medical  
8 files.

9 And then NIOSH went and took 200,  
10 and I think this is correct, they took 200  
11 people, they looked at their records, and see  
12 if they found any information that wasn't  
13 located in these three major databases.

14 My understanding, the index file is  
15 kind of a new system where you're putting data  
16 that's from other systems, is that right?

17 MR. CALHOUN: I think so, but Tim  
18 knows that better than I do.

19 MR. ADLER: That's correct. It  
20 could largely be viewed as a result of this  
21 program.

22 DR. BUCHANAN: Now is this

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1 maintained at Brookhaven?

2 MR. ADLER: Yes, it is.

3 DR. BUCHANAN: Is this separate from  
4 the HPRS?

5 MR. ADLER: It is. It's another  
6 point, another location that would be checked  
7 when a claim comes in. And it's a culmination  
8 of the various different record keeping  
9 locations that we know have existed.

10 DR. BUCHANAN: Now is it handwritten  
11 or electronic?

12 MR. ADLER: It's all hard copy  
13 stuff.

14 DR. BUCHANAN: Okay. And so we see  
15 here that essentially what this shows is that,  
16 before 1980s, there was some indication that  
17 NIOSH found some data that was not in the  
18 three major files.

19 And then after 1980, there was less  
20 of this data missing from the major files.  
21 There was not a whole lot in either pre or  
22 post 1980.

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1           Again, just a method to see if  
2           there was a change in step functions around  
3           the 1980s.

4           Now we did look at the data storage  
5           systems and this is where it gets a little  
6           fuzzy on what is, where things are stored.

7           I did make a chart and attached it,  
8           B, I think, that gives an outline of where  
9           things were stored when.   Page 35, bioassay  
10          data issues matrix.

11          And you see that I list on there  
12          where my understanding of the data is stored.

13          And so I guess I'd like to clarify it for  
14          myself and for the Working Group, Grady, at  
15          this point on the storage of the records.

16          Now we understand that we, the  
17          personnel monitoring files are mainly  
18          handwritten and are available, is that  
19          correct?

20          MR. ADLER: Handwritten copies of  
21          memos that have results reported on them. It  
22          could be analytical data sheets. There's a

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1 variety of forms.

2 DR. BUCHANAN: Now this was usually  
3 from earlier years?

4 MR. ADLER: The personnel monitoring  
5 files?

6 DR. BUCHANAN: Right.

7 MR. ADLER: Well, prior to HPRS,  
8 yes, that's been going on for decades, there  
9 has been a personnel monitoring file.

10 DR. BUCHANAN: So there could be  
11 records, bioassay records in there up to 2001,  
12 through 2001?

13 MR. ADLER: I suppose that's  
14 possible.

15 DR. BUCHANAN: But most of them are  
16 earlier?

17 MR. ADLER: Yes, most of them are  
18 earlier.

19 DR. BUCHANAN: It's when they  
20 changed to electronic systems here and there  
21 and they quit doing, they quit maintaining the  
22 handwritten records when the electronic

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1 systems came in.

2 Okay, and now are these records, do  
3 they, just say that Joe received a whole body  
4 count or a urinalysis, or does it have  
5 results, what you've seen, do they always have  
6 the actual numerical data?

7 MR. CALHOUN: We can't count them  
8 unless they've got the numerical data. So,  
9 and any of the samples that we've done, just a  
10 checkbox that he's been monitored, we can't  
11 count that. We don't count that.

12 We have to have a count that says  
13 here's what he was monitored for and it was  
14 either negative or positive and here's how  
15 positive it was.

16 DR. BUCHANAN: Okay, but I'm saying  
17 if you go and you open up a folder in the  
18 personnel monitoring file, usually are the, is  
19 there a sheet of paper in there that says he  
20 had a bioassay? Or does it, have you found  
21 that it lists the numerical results?

22 MR. CALHOUN: Both. It will be

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1 both. It will be, and it comes in different  
2 ways. I've seen the actual spectrum provided  
3 for a whole body count. And I've seen a list  
4 that says, you know, John Smith was monitored  
5 on this date and his potassium level was this,  
6 his cesium level was this and here's, there's  
7 usually like three or four other columns, and  
8 here's what those were.

9 DR. BUCHANAN: And does it ever just  
10 say he had a urinalysis and whole body count,  
11 but no results were there?

12 MR. CALHOUN: I haven't seen that,  
13 that wouldn't be very useful to us.

14 DR. BUCHANAN: Right, yeah, I just  
15 wondered, you know, so if it's there, it's  
16 useful to you.

17 MR. CALHOUN: Right.

18 DR. BUCHANAN: You found it in the  
19 handwritten, in the personnel monitoring file.

20 MR. CALHOUN: Right. And that's how,  
21 the one new thing that I found, came about is  
22 that there was a list and it was just a table

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1 of individuals and they were monitored in  
2 1979.

3 I don't have the results, find  
4 them. And so then somebody would send them  
5 those results. And we went back through and  
6 looked for those results and we actually found  
7 them for 1980.

8 But, again, that was only in May,  
9 so they had five months to screw up, so.

10 DR. BUCHANAN: Okay, now, so that's  
11 personnel monitoring. That's one of the major  
12 repositories of the data.

13 The other one is the medical files.

14 Okay, now I assume this generally has  
15 physical checkups and blood count and that  
16 sort of thing, and X-rays, perhaps.

17 Does, but it has mainly whole body  
18 counts, if it has anything, from the medical  
19 department?

20 MR. CALHOUN: I've seen primarily  
21 whole body counts, I don't know what you have,  
22 Tim, besides the X-rays, of course.

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1                   MR. ADLER: There could be other  
2 blood work, but you'll find whole body counts.

3                   DR. BUCHANAN: And this would,  
4 again, would have the results with it. And  
5 this is probably the one that was performed at  
6 the reactor whole body facility, before they  
7 switched over to the --

8                   MR. ADLER: The medical building,  
9 yes.

10                  DR. BUCHANAN: Okay. And are those,  
11 I guess every time you have a request or BNL,  
12 I realize you don't do it, but the person at  
13 BNL that receives the request for dose  
14 reconstruction data, they would check the PM  
15 files and they'd check the medical files.

16                  MR. CALHOUN: They do now. Now,  
17 they did not. And once we got them on board  
18 with that, there was a date. And we re-  
19 requested all of the data from that point that  
20 we had already received, and they sent us data  
21 and they added the additional stuff that they  
22 found from the other repositories. And now

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1 they do it routinely.

2 DR. BUCHANAN: Physically, you got  
3 the fence around Brookhaven, now you've got a  
4 place where the PM files are stored in some  
5 Admin Building and then you've got the medical  
6 files that are still stored in a separate  
7 building?

8 Or do they have to go to the two  
9 different buildings to retrieve that data?

10 MR. CALHOUN: I don't know that, I  
11 imagine that they do. I just know they call  
12 them three different repositories that they  
13 look into.

14 And I can't imagine that they're  
15 all sitting in the same file folder, you know.

16 DR. BUCHANAN: Now the index file,  
17 this is data that mainly NIOSH has gathered  
18 while they've been working at BNL and this is  
19 a copy, it's a, you know, it's an electronic  
20 database of copied material?

21 Or what is the index, physically?  
22 Where is it at and what is it?

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1                   MR. CALHOUN: I don't know what the  
2 index file is.

3                   MR. ADLER: The index file is what  
4 we also call Lee Michel's bioassay file.

5                   MR. CALHOUN: Okay.

6                   MR. ADLER: It's a compilation of  
7 anything that would be of interest for any, to  
8 a persons personnel file. Like the memos,  
9 memos with data on it.

10                   They wouldn't necessarily have data  
11 on it, but things that have been gathered.  
12 It's not fair to say NIOSH has gathered it  
13 all, but as a result of EEOICPA occurring,  
14 there's been a much greater thrust to get data  
15 all collected and retrievable for any  
16 particular claim that comes through.

17                   So, it's going to be a combination  
18 of things.

19                   MR. CALHOUN: And here, I can't show  
20 everybody this, but I'll show you it. This is  
21 just an example I just pulled up.

22                   This is somebody that was re-

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1 requested. They had provided us, initially  
2 they provided us no whole body counts. And so  
3 this individual is one of these, and this is  
4 the kind of information we get.

5 It's not separated. This is one  
6 example of the type of information we get.  
7 So, these are whole body counts for 1984 and  
8 1985. It was just the first one that I pulled  
9 out.

10 And so this is the guy right here.

11 We see, you know, when he was counted,  
12 potassium, cesium, cobalt, zinc, manganese,  
13 cobalt-58 and iron-59.

14 DR. BUCHANAN: Now what file did  
15 that come from? Do you know where they  
16 retrieved that?

17 MR. CALHOUN: I don't know where  
18 they got it, except for it may have been from  
19 the medical file, because I got all the X-ray  
20 data.

21 I doubt that it was from the  
22 medical files with this guy, because this is a

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1 compilation of HFBR counts.

2 DR. BUCHANAN: Okay, so we have the  
3 index file, which is a computer-based, a  
4 scanned copy of any data that might be  
5 important for dosimetry.

6 MR. ADLER: Computer-based?

7 DR. BUCHANAN: Yes, I mean, it isn't  
8 a hard copy. You don't go in and go through  
9 paper.

10 MR. ADLER: This index is hard copy.

11 DR. BUCHANAN: Okay, index is hard  
12 copy.

13 MR. ADLER: Yes.

14 DR. BUCHANAN: Of scanned or  
15 originals? Both?

16 MR. ADLER: Both, I would guess.

17 DR. BUCHANAN: Okay, and then we  
18 move on and we have the HPRS database which  
19 supposedly has all the bioassay data on it  
20 that was taken from 2002 forward, is that  
21 correct?

22 MR. ADLER: That's my understanding.

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1 DR. BUCHANAN: Okay, now, there are,  
2 were some electronic databases maintained in  
3 the individual departments. How is, where is  
4 that data today and how do you access that?

5 MR. ADLER: Much of that data, I  
6 just asked Rich Reciniello, to go over a lot  
7 of this work at the site, just this past week  
8 to confirm what I had understood earlier, and  
9 it's the same situation. Most of these little  
10 ancillary things that we refer to in the  
11 report, have now been pulled into PM files or  
12 I guess possibly the index file also, as they  
13 see appropriate.

14 Depending on the form of the data.  
15 There may be, I think he mentioned there  
16 might be one electronic database that they  
17 routinely search, in addition to the three  
18 that we have in the report.

19 If there's a reason, they know  
20 what's in that database. If there's some  
21 indication this person might have data in  
22 there, they search it.

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1                   Otherwise, there's been an effort  
2           to consolidate into the three primary  
3           repositories.

4                   DR. BUCHANAN: Are these smaller  
5           electronic databases, are they still  
6           functional today? I mean are they able --

7                   MR. ADLER: I don't know that.

8                   DR. BUCHANAN: You don't know.

9                   MR. ADLER: I shouldn't say.

10                  DR. BUCHANAN: Okay, so --

11                  MR. ADLER: But I did ask  
12           specifically, is there anything in these  
13           things that are going to be missed, or could  
14           be missed when a claim comes through? And he  
15           said, no, that should not be the case.

16                  MR. CALHOUN: It's a little bit more  
17           work for them to look for stuff now.

18                  MR. ADLER: Right.

19                  MR. CALHOUN: Because they've got to  
20           go to three different places.

21                  MR. ADLER: Three or possibly a  
22           little bit more, depending on the person.

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1 Sometimes they search a little bit more.  
2 There's the three primary, though.

3 DR. BUCHANAN: Okay, so, what I've  
4 tried to lay out here is what we know and  
5 don't know about the internal database, in-  
6 house.

7 To me what's important is in the  
8 dose reconstruction. What does the dose  
9 reconstruction oversee. And that's the kind  
10 of proof in the pudding. Is it available?  
11 Now, it does bother me, I guess I'd like to  
12 look at ER Report on Page 15.

13 We had table 4-1, there, and like I  
14 say, this is kind of the bottom line. Which,  
15 it's the third, and maybe there's an  
16 explanation for it.

17 Now, apparently this has been  
18 somewhat updated. This one is effective  
19 September of 2009. We had total claims of 92.  
20 I think you said 153.

21 MR. CALHOUN: Yes.

22 DR. BUCHANAN: So that's increased

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1 quite a bit in the last six or eight months.  
2 Total number of claims that fall under this  
3 SEC consideration was 92, all of them, of  
4 course, it's the whole period.

5 The number of claims completed.  
6 Now, here it was 28, and you say that 58 have  
7 been completed.

8 MR. CALHOUN: Yes.

9 DR. BUCHANAN: So they've completed  
10 about 30 more claims in the last eight months  
11 or so. And then the ones with internal  
12 dosimetries were attained, was 21.

13 Now, we need to break that down a  
14 little for the details, and external had 43.  
15 So if we look at this, we have 64 claims, read  
16 on down the text there.

17 You see we have at least 92 claims,  
18 64 have been responded to. For the records,  
19 64 out of 92, and that 61 had no bioassay  
20 data.

21 Three had tritium data, which came  
22 from the external dose records from Landauer.

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1 Tritium was considered external dose or whole  
2 body dose from '85 to '95.

3 And so, and then NIOSH later went  
4 back and found an additional 18 bioassay data  
5 records. Thirteen of these was of the 64 that  
6 we were considering here.

7 And so that's where this number 21  
8 comes from on the table up there. NIOSH went  
9 back and dug some of those out, on their own,  
10 I guess. And five of them were for claims  
11 that they hadn't worked yet, that was part of  
12 the 92.

13 And so, I guess, you know, to me  
14 this is kind of a red flag on that part and  
15 now there might be some explanation. Maybe  
16 these took place before 1980?

17 Maybe they were, a lot of them were  
18 prior to that, when the records weren't  
19 available. Maybe it was after 1980 and the  
20 records weren't available, I don't know.

21 Maybe most of them were office  
22 workers or other people that didn't. So, I

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1 can't tell what the explanation for that is.

2 You know, one concern is that there  
3 wasn't any bioassay data for it. And so I  
4 assume that probably Grady doesn't have that  
5 information at hand.

6 MR. CALHOUN: Not off the top of my  
7 head, I don't, no, I do not.

8 DR. BUCHANAN: And so, but that  
9 leads into, Number one, a concern, and  
10 reinforces our first concern about bioassay  
11 data retrievability. And, secondly, I think  
12 it would be useful to look at these claims.

13 There's even more claims today.  
14 And see why the bioassay data wasn't there.  
15 Now, you stated this morning that there's 153  
16 claims, 34 of them were because of, would be  
17 removed because of the SEC through 1979, if  
18 that's what you're saying?

19 MR. CALHOUN: Right.

20 DR. BUCHANAN: Okay, so that leaves  
21 61 remaining and they've done 58. It would be  
22 interesting to look at those 58 that was

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1 completed or the full 61, and see if there  
2 was, why, did these people have bioassay data?

3 Did they not? Were they in  
4 positions that should have? What the time  
5 period was? Was it early or late? And so I  
6 guess, this is kind of my summary is that this  
7 page here is an area that's still open for  
8 debate.

9 And so, you know, the gray area is  
10 '80 to 2001, how the data is actually  
11 retrieved and given to the dose  
12 reconstructors.

13 And then the concerns about the  
14 bioassay data being available for the dose  
15 reconstructor.

16 CHAIR BEACH: Okay, so, Grady, I  
17 don't know if you want to talk to the ER on  
18 that or?

19 MR. CALHOUN: I actually think  
20 that's a good idea, going back and reviewing  
21 the cases in-house and looking at how they  
22 support the 1980 data. No problem with that.

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1 CHAIR BEACH: Okay.

2 MR. CALHOUN: I've got it written  
3 down.

4 MEMBER ANDERSON: Good action stuff.  
5 Clear cut, concise.

6 CHAIR BEACH: Before we move on to  
7 the second item --

8 DR. MAURO: Oh, just --

9 CHAIR BEACH: No, go ahead.

10 DR. MAURO: I think that's good. I  
11 like that, because remember the concerns I was  
12 raising? I'm sorry, the concerns I was  
13 raising, that goes right toward it.

14 When you hit a person that's in  
15 post-1980, that --

16 MR. CALHOUN: Doesn't have a  
17 bioassay.

18 DR. MAURO: Doesn't have bioassay --

19 MR. CALHOUN: Is there a reason why?

20 DR. MAURO: What's the story? Why  
21 is it okay that he doesn't have it? At the  
22 extent to --

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1                   MR. CALHOUN: I actually started  
2                   doing that, but I --

3                   DR. MAURO: And then that's it, as  
4                   far as I'm concerned, that's it.

5                   CHAIR BEACH: Okay.           And I'm  
6                   wondering, let's, I think maybe we should  
7                   review the action items for the first one,  
8                   before we start into the neutrons.

9                   Because I don't want to get lost  
10                  and -- so this is just a quick glimpse and of  
11                  course, the Work Group probably has some other  
12                  ideas of some of the action items. I know I  
13                  got some from Joe and talked to Ron a little  
14                  bit at the break.

15                  So for, on NIOSH's side, we're  
16                  looking for the retrievability of the records.

17                  So the stats, evaluations. I guess the  
18                  steps, the process that you used to retrieve  
19                  those records.

20                  The air sampling data for bioassay  
21                  decisions. And mapping the completeness and  
22                  adequacy of the records. And I know these are

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1 tall orders, but we have, the need for  
2 information on job descriptions, dates of  
3 employment.

4 So, that's one that I talked to Ron  
5 about. But, if you go back and look at an  
6 individual, what their job was, how long they  
7 were on job, and then possibly being able to  
8 coincide that with bioassay records. Did I  
9 capture that, Ron?

10 DR. BUCHANAN: Yes.

11 CHAIR BEACH: Okay.

12 MEMBER MUNN: But isn't that recent  
13 --

14 MR. CALHOUN: Yes, but I think what  
15 they're looking for is a table or something  
16 that shows that, okay, this person worked in  
17 1982, he has bioassay, so we're good.

18 Or, he worked in 1982, doesn't have  
19 bioassay, but he was, you know, a rigger that  
20 worked outside for 15 minutes, you know,  
21 something, it doesn't have internal or  
22 external monitoring.

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1           Just a kind of a reasonable  
2 explanation as to why there's no internal.

3           CHAIR BEACH: And this is just for  
4 the dates --

5           MR. CALHOUN: Post-1980.

6           CHAIR BEACH: Post-1980.

7           MR. CALHOUN: Correct.

8           CHAIR BEACH: On to 2001 or even  
9 later.

10          MR. CALHOUN: Let's keep it post-  
11 1980 at this point.

12          CHAIR BEACH: Definitely. How many  
13 people employed, were employed that fell into  
14 that time frame, the 1980 to 2000?

15          MR. CALHOUN: Well, I don't even  
16 know if that's obtainable.

17          MEMBER ROESSLER: That's an  
18 important number.

19          CHAIR BEACH: It is an important  
20 number.

21          MR. ADLER: In the human resource  
22 database, we've had poor luck getting access

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1 to that.

2 MR. CALHOUN: How many people or how  
3 many claims?

4 MEMBER ROESSLER: It's the people --

5 MR. CALHOUN: Why is that important?

6 MEMBER ROESSLER: Well, because the  
7 claims is only, just a piece of data, but I  
8 think we're looking at a huge site.

9 DR. NETON: Yes, but you can't, the  
10 number of people that could or should have  
11 been monitored, who would never know that.

12 I mean so say there's 20,000 people  
13 at the site and what does that mean? That  
14 20,000 should have been monitored, 500? I mean  
15 it's really not very informative, I don't  
16 think.

17 MEMBER CLAWSON: Well, if you have  
18 programs, is what you're saying, there should  
19 be something in there that this many people  
20 are under the monitoring program, as we've had  
21 with most of the sites.

22 DR. NETON: Well, this is a very

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1 different site. I mean this is a research-  
2 oriented site that had projects that were  
3 started and stopped very frequently.

4 I mean there was not a continuous  
5 process here like you see for a uranium  
6 foundry or something like that.

7 MEMBER MUNN: Not all of which were  
8 radiological.

9 CHAIR BEACH: So is there a  
10 narrowing that we can ask for that would make  
11 that simpler?

12 DR. NETON: It seems to me that the  
13 relative thing is, the relevant thing is, if  
14 we determine that there were 70 cases that  
15 need to be reconstructed after 2000, and we  
16 can demonstrate that we could disposition each  
17 of those cases as to whether or not they  
18 required bioassay.

19 If they didn't, why they didn't  
20 have it, you know. That's about as good as  
21 we're going to be able to do, I think.

22 You can't start, you know,

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1 speculating there may be 800 more cases that  
2 come in that all of a sudden don't fall into  
3 that pattern. And it would be very hard to do  
4 that.

5 CHAIR BEACH: Okay, well I guess  
6 it's a start. Steps that NIOSH takes to  
7 retrieve the records. So we're looking kind  
8 of at what do you do when you go in to start  
9 retrieving records?

10 MR. CALHOUN: A data capture or for  
11 DRs.

12 DR. BUCHANAN: Not that you sent a  
13 request and they sent it back. And I don't  
14 know that you do this, but the person at BNL,  
15 where does he go? We just talked about it.  
16 Were the medical records and the PM records  
17 all, you know, the same place or is this index  
18 file, you know, hard copy?

19 We just need a comfort level with  
20 how it's done or some information on how it's  
21 done. You know, when you send a request  
22 there, what steps take place?

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1           One guy goes around and he goes to  
2           this building, he goes to this building, he  
3           goes to this building? All right, how did he  
4           decide whether these older electronic  
5           databases are going to be queried. Who makes  
6           that decision?

7           If he does are these up and running  
8           and can he go and get the data? We don't know  
9           how this is done. This is unusual at this  
10          site that there are so many places that these  
11          things are stored.

12          You know, most sites you, at least,  
13          if they're missing, they might be missing, but  
14          they're missing from one place. And so, you  
15          know, we don't want to say that the data is  
16          missing, if it is available.

17          And we don't want to say, well,  
18          it's okay if there's an electronic database  
19          sitting in a basement someplace in mothballs  
20          that has data that's no place else.

21          And so that's what we want to scope  
22          out.

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1 CHAIR BEACH: Okay, the last one I  
2 wrote down was review the 61 active cases and  
3 the 58 closed cases for bioassay data. So,  
4 are there others that I didn't --

5 MR. CALHOUN: I got that one  
6 already.

7 CHAIR BEACH: Yes, he actually wrote  
8 that down. I just wanted to make sure that --

9 MR. CALHOUN: That was the first  
10 one. That's my first one.

11 CHAIR BEACH: That was his first  
12 one. And then, Gen, you had something?

13 MEMBER ROESSLER: I think we've  
14 talked about interviewing people and we  
15 usually talk about interviewing workers. I  
16 think in this case I'd be interested in  
17 interviewing those managers, who are still  
18 there, are still available, still alive, who  
19 were there particularly at that critical time  
20 period.

21 Certainly, they know a lot more. I  
22 have big questions. Like when we talk about

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1 bioassay, which we are and specifically Ron  
2 has looked a lot and Grady, into whole body  
3 counting.

4 I don't even know how many whole  
5 body counters there were. Maybe you guys do.  
6 And what were they used for? Clearly, when  
7 you look at the research, they produce a lot,  
8 the whole body counting was research.

9 Monitoring of Marshall Islanders  
10 and so on. Are there different whole body  
11 counters? You know, when you look at these  
12 records, I guess really what I'm saying is  
13 that I think we need to explore better,  
14 talking to the people who were there and know  
15 the answers to a lot of these questions.

16 CHAIR BEACH: So are you looking for  
17 a NIOSH interview, SC&A interview or a  
18 combination, what are you thinking?

19 MR. CALHOUN: We share all of our  
20 information, so, I'm sure we've done some of  
21 these. We might just have to come up with  
22 some more questions.

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1                   MEMBER ROESSLER: I don't think all  
2                   the pertinent people have been contacted.

3                   MR. CALHOUN: Right.

4                   CHAIR BEACH: And I guess I would  
5                   suggest that, a combination because there's  
6                   always different questions and it's better to  
7                   give them one interview instead of several,  
8                   seems to work better.

9                   DR. MAURO: So, in terms of that  
10                  request, it sounds like a plan would be put in  
11                  place to followup on some interviews, design  
12                  an interview program, and it would be a  
13                  collaborative effort where both NIOSH and SC&A  
14                  would team up and make the visit?

15                  CHAIR BEACH: Yes.

16                  MR. CALHOUN: Sure.

17                  CHAIR BEACH: I would prefer that.

18                  MR. FITZGERALD: And I guess, again,  
19                  the focus would be, and we did talk to some  
20                  folks that covered a time frame, but really  
21                  keying in on the project or facility managers  
22                  who would have been making the calls that

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1 we're talking about, in that crucial 1980,  
2 just after 1980 period.

3 CHAIR BEACH: And prior to the  
4 interviews, I would suggest maybe a list of  
5 questions, if you have questions or if you  
6 want to review the questions.

7 Because, Gen, you might have  
8 questions that I wouldn't think to ask.

9 MEMBER ROESSLER: I have some  
10 suggested names that I can come up with  
11 questions.

12 CHAIR BEACH: And could you email  
13 that out to the Work Group?

14 MEMBER ROESSLER: Sure.

15 CHAIR BEACH: And if anybody else  
16 has that same list. So that's all I have,  
17 unless there's any other --

18 MEMBER CLAWSON: I was just  
19 wondering, do we have a good handle on what  
20 projects actually were going on down there?

21 I know there was numerous ones, but  
22 do we have a good handle on --

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1                   MR. CALHOUN: Yes, I've got it,  
2                   except for the, you know, some of the little  
3                   things. I mean at the time, in 1980, we've  
4                   got the high flux beam reactor, medical  
5                   research reactor, radiation therapy facility  
6                   started in '91.

7                   These are all on TBD. AGS, that's  
8                   Alternating Gradient Synchrotron, Tandem Van  
9                   de Graaff. Another Brookhaven Linac Isotope  
10                  Producer, National Light Synchrotron, heavy  
11                  ion collider.

12                  MEMBER CLAWSON: The reason I was  
13                  wondering is because Brookhaven --

14                  MR. CALHOUN: Mostly accelerators.

15                  MEMBER CLAWSON: Yes, Brookhaven  
16                  showed up at Pantex as being contacted and I  
17                  never could get into what it actually was, and  
18                  I just wanted to make sure that we didn't have  
19                  some other items sneaked in there.

20                  MR. CALHOUN: We have run into  
21                  absolutely nothing as classified at this place  
22                  --

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1                   MEMBER CLAWSON: Okay. And see what  
2 they might have been doing is, from some of  
3 their neutron or whatever else like that, just  
4 requesting from them, just running some things  
5 by them, I guess you could say.

6                   I saw some correspondence between  
7 Brookhaven and Pantex and that's why I was  
8 wondering.

9                   DR. BUCHANAN: There was a good  
10 point brought up of the number, and you might  
11 want to clarify -- was the number of whole  
12 body counters.

13                   My understanding is that the  
14 medical facility had one whole body counter,  
15 which was their original workhorse. And then  
16 they had the Marshall Island ones that went  
17 out and came back for six weeks at a time or  
18 something.

19                   That was the second one which S&EP  
20 took over and then later they changed it to  
21 sit down and stand up or whatever.

22                   But that was a two main whole body

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1 counter, and I guess still exists today.

2 MEMBER ROESSLER: So the first one  
3 was probably the big four pi liquid  
4 assimilation -- maybe. And the second one was  
5 probably --

6 DR. BUCHANAN: Sodium iodide.

7 MEMBER ROESSLER: Sodium iodide, the  
8 portable one.

9 DR. NETON: The one that went to  
10 Marshall Island was a CANBERRA-6000 chair.

11 MEMBER ROESSLER: That was sodium  
12 iodide. But the medical one, what was that?

13 DR. NETON: It was a CANBERRA chair,  
14 it was a sit down chair.

15 MEMBER ROESSLER: It was a chair.

16 DR. NETON: Like they use in nuclear  
17 power plants.

18 MEMBER ROESSLER: Yes, okay.

19 DR. NETON: And then eventually they  
20 moved to a standup counter. The one that I  
21 also noted with, in the medical department, it  
22 was a, sort of a flatbed four pi counter

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1 almost. A sheet of 4 by 4 by 16 inch  
2 detectors on top and bottom.

3 I think 32 on top and 32 on the  
4 bottom.

5 MEMBER ROESSLER: And sodium iodide.

6 DR. NETON: The person was  
7 essentially sandwiched in between. A very  
8 nice, beautiful counter, a research type  
9 facility.

10 MR. FITZGERALD: I have a  
11 clarifying, just on the list of actions as  
12 we're talking about that. The first one she  
13 mentioned was one that I was keying in on,  
14 Grady, what you had said earlier, you had  
15 begun over, I guess recently to do some  
16 retrievability-type tests.

17 And I don't know how far you've  
18 gotten along, but I think that would be  
19 helpful to know what some of those results  
20 are.

21 You say you're getting some  
22 positive results. I think that's what I was

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1 referring to on that first one. That's a  
2 little different than the other one.

3 MR. CALHOUN: The first  
4 retrievability is the one that's included in  
5 the ER. The next one I talked about was, it's  
6 not that I set out to do a retrievability  
7 test, I just found a memo that said, hey,  
8 we're missing these records, find them.

9 And so then I, in that same folder,  
10 I found that they did, in fact, find the two  
11 that were missing from 1980. I didn't look a  
12 whole lot in the previous years, but it looks  
13 like 80 percent were not retrievable from  
14 1979, but 100 percent were from 1980.

15 And there's some other years that  
16 were better than that. I also looked on my  
17 own back through some of the SRDB documents  
18 that we have that just are tabular whole body  
19 counting results.

20 Not whether or not you were  
21 counted, but the results. And I found those  
22 two 1980 results, as well.

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1 MR. FITZGERALD: Okay, so this isn't  
2 a --

3 MR. CALHOUN: That was just a little  
4 --

5 MR. FITZGERALD: This is something -  
6 -

7 MR. CALHOUN: That was to get  
8 prepared for here.

9 MR. FITZGERALD: Okay, so that first  
10 one, I think that this is helpful validation  
11 but I thought that you were going through a  
12 process.

13 MR. CALHOUN: Oh, now, I'm going to  
14 do, that I said I started, that I didn't even  
15 talk about here, was going through the cases  
16 we've got from 1980.

17 MR. FITZGERALD: Right.

18 MR. CALHOUN: And I'm going to look  
19 in job classification, era obviously, external  
20 dosimetry, internal dosimetry and is there a  
21 reason why they don't have it?

22 MR. FITZGERALD: Okay, so that first

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1 one, just to clarify, you can strike that. I  
2 didn't want it to overlap or confuse on the  
3 other one. The other one is more --

4 MR. CALHOUN: That's what I'm going  
5 to do.

6 MR. FITZGERALD: The other one was,  
7 you mentioned index file. And I won't mention  
8 the individual, but we interviewed the same  
9 one who is maintaining the index file.

10 He wasn't able, at the time, and  
11 we're trying to figure out if you could  
12 somehow, you know, have a compilation of what  
13 he thought he had obtained.

14 You know, he was trying to pull  
15 this together to support the requests that  
16 were coming from you all. And it didn't sound  
17 like -- this was a year ago.

18 He was in progress. He was running  
19 around trying to do this. Is there anyway to  
20 get, you know, sort of a snapshot of what the  
21 status, and this is what I meant by the  
22 roadmap.

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1                   I hate to use that word. Mapping  
2 of completeness and adequacy of the records.  
3 Now, where that stands, I mean is the index  
4 file -- I'm not clear on whether there's a,  
5 you know, sort of a --

6                   MR. ADLER: Index for the index  
7 file?

8                   (Laughter.)

9                   MR. FITZGERALD: Well, just you  
10 know, index sounds like a way to get to what  
11 is there. But is that a complete listing of  
12 what has been obtained, compiled by him, so  
13 far?

14                  MR. ADLER: There is, I don't know  
15 if it's, there is an index for this index  
16 file.

17                  (Laughter.)

18                  MR. FITZGERALD: So, you're not  
19 joking?

20                  MR. ADLER: No, I'm not. It  
21 honestly doesn't have a great deal of detail  
22 in it. You kind of have to go look. But it's

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1 got the list of names for which information  
2 has been found.

3 MR. FITZGERALD: I was kind of  
4 thinking, you know, most of the facilities  
5 we've looked at in terms of a record, you  
6 know, sort of a compilation of what's there is  
7 sort of by time and facility.

8 And, you know, you have all of the  
9 bioassay records from such a date to such a  
10 date, except for we're missing, you know,  
11 they'll give you a gap of some sort.

12 And that's something we haven't  
13 been able to put our hands on.

14 MR. ADLER: Yes, this file would  
15 just be various Excel spreadsheets and the  
16 Sheet Title will be, we've got information  
17 from 1980, '81, '82, on this one.

18 MR. FITZGERALD: And it would be by,  
19 you will see names of people.

20 MR. ADLER: Just the people  
21 themselves. Then you know what file folder to  
22 go to and then see what's actually in there

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1 for that person.

2 MR. FITZGERALD: Right, so really  
3 there isn't anything activity or facility  
4 based, it's all just by individual name and  
5 then --

6 MR. ADLER: Yes, for that particular  
7 repository.

8 MR. FITZGERALD: Because I was  
9 thinking like HFBR, we don't really have a  
10 summary of what the numbers that were bioassay  
11 for HFBR by year from --

12 MR. ADLER: What totals should be  
13 available?

14 MR. FITZGERALD: You know, how many  
15 records we have by year for that facility.  
16 And that's not available?

17 MR. ADLER: We have in the ER what  
18 we have come across in the capture. But  
19 that's --

20 MR. FITZGERALD: I'm not saying it  
21 exists, I'm just saying we haven't found it  
22 either, and it just sort of makes it hard.

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1 You're almost forced to go back and see what  
2 you happen to have and work backwards.

3 You know, figure out, you know,  
4 this question of should they have been  
5 bioassay. But from an operational standpoint  
6 saying, here's a facility that handled medical  
7 isotopes.

8 Well, if these people were at that  
9 facility and there should be, you know, there  
10 should be coverage for that facility. We  
11 don't have that sort of top down summary.

12 I haven't seen it and you haven't  
13 seen it.

14 MR. ADLER: No, no, I think in most  
15 cases if you want to determine how much data  
16 you have for a particular facility, you would  
17 have to go into each individual file of each  
18 person that had worked there.

19 MR. FITZGERALD: You have to work  
20 bottom up, okay.

21 MR. KATZ: Just from what you just  
22 said, Joe, and what I was thinking before you

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1 even said that, so Josie had this one action  
2 item that, this mapping the completeness, but  
3 it's hard for me to imagine.

4 Is it clear to you how you would  
5 map the completeness of data on a facility on  
6 an operational basis?

7 DR. NETON: No, I think the key  
8 there is a document that the program was in  
9 place to monitor the workers and the ones that  
10 were supposed to be monitored, were.

11 MR. FITZGERALD: I think you  
12 answered my question. I was thinking, now  
13 let's take an obvious one, like the HFBR and  
14 say, okay, you know, what's the monitoring  
15 history in that facility.

16 And what, I'm not saying that, you  
17 know, it's easy, because I didn't find  
18 anything. And it's kind of remarkable when  
19 you go to HFBR and look through their records  
20 and you can't find, you know, here's your  
21 monitoring history for the facility.

22 And maybe that's something we need

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1 to take another close look at, but it doesn't  
2 appear that, so far anyway, we've found that  
3 summary that would give you at least a more  
4 top down.

5 It's really going to be difficult  
6 and it's almost sort of an empirical thing,  
7 where you're trying to do it by individual by  
8 individual.

9 So, I, that crossed my mind, but  
10 I'm not saying it's easy and I'm not saying  
11 that it's something that's going to be  
12 feasible.

13 But, I think that would be  
14 something we'd want to look for, still. And  
15 we didn't find it on the first pass. It was a  
16 Site Profile review, so we spent so much time  
17 and then stopped.

18 But somehow, for some of these key  
19 facilities, where you would think there would  
20 be potential uptakes, it would be useful to  
21 get a summary.

22 And I would think that record would

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1 have to exist somewhere. I haven't seen it,  
2 but I just want to make sure that index wasn't  
3 it and it isn't it.

4 So maybe that's less a, you know,  
5 it sort of reminds me, it's less a mapping but  
6 an exploration of finding that summary or if  
7 that information exists, so you have something  
8 more than just a bottoms up.

9 MR. CALHOUN: I believe I've seen a  
10 snapshot of a one-pager from HFBR, in  
11 particular, that just says these individuals  
12 were counted, and it's an entire listing of  
13 individuals from HFBR that were counted on  
14 this date and here's the results.

15 I can't tell you how many weren't  
16 counted.

17 MR. FITZGERALD: I guess I would  
18 modify that and I think, Ted's got a point, we  
19 probably, it's sort of like looking for the  
20 documents that Gen was talking about.

21 I think we need to maybe see if we  
22 could find more that's summary top down that

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1 would combine with the bottom up, that would  
2 give us a better picture.

3 CHAIR BEACH: Well, one thing I'll  
4 do too, is I'll send this list out to both  
5 you, Grady and Joe, and you guys, that would  
6 clarify anything that we might have missed or  
7 I might have missed in writing this down.

8 MR. CALHOUN: BNL has been very  
9 reluctant to give us data, give us access to  
10 any data that weren't claimants. Very  
11 reluctant. Actually, they won't.

12 (Laughter.)

13 MR. CALHOUN: The only time that  
14 we've been able to do that, is when we have  
15 found individual names in the files and that's  
16 how we did our 69 person study.

17 CHAIR BEACH: That's interesting.

18 DR. MAURO: But this goes to what  
19 Gen mentioned before, the interviewing the  
20 managers or the people that we know were in  
21 charge of certain programs.

22 In terms of the top down story.

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1 They may be able to give you that story.  
2 Maybe you can't find the story in the records,  
3 but they may be able to say, listen, for this  
4 program, over these years, this is how we  
5 conceived of the great radiation protection  
6 oversight, what it involved.

7 And whether there's documents that  
8 go along with that interview, that's another  
9 matter. He may point you in that direction.

10 So the idea of a top down, bottom  
11 up approach, is great. The top down may or  
12 may not be successful, the interviews may help  
13 us there.

14 Bottom up, though, seems to be the  
15 real --

16 MR. CALHOUN: I agree, that's where  
17 --

18 DR. MAURO: But if you go both  
19 directions, it's almost like single failure  
20 proof. You know, you try to get it, you do  
21 the best you can.

22 CHAIR BEACH: Okay, thank you.

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1 We're ready to start in on the second item in  
2 the matrix, adequacy of neutron dosimetry.  
3 And Ron, Joe are you going to --

4 MR. FITZGERALD: Well, I can tee it  
5 up real quickly. This is part of the data  
6 capture we did for the Site Profile. And we  
7 were looking through correspondence logs and I  
8 found a rather interesting dialogue that had  
9 taken place amongst the HPs at Brookhaven, and  
10 it was a pretty healthy debate over about ten  
11 years, about what particular neutron dosimetry  
12 would be, should be used and ought to be used.

13 And it involved also Landauer,  
14 which was the vendor, and some concern that  
15 the dosimeter that was being used in the  
16 process and wasn't appropriate for the  
17 energies involved.

18 And this was seesawing back and  
19 forth. And one reason we raise this as an  
20 implication, it wasn't cited in the ER, but it  
21 causes some concern about, on the ground what  
22 was happening.

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1           And we were trying to interview  
2 people and they acknowledged, the people  
3 actually were still there, acknowledged that  
4 it was this debate and, you know, that they  
5 felt that it wasn't a valid scientific  
6 question about how they should monitor  
7 neutrons in certain operations and getting the  
8 energies.

9           And they felt Landauer wasn't  
10 responsive. And, you know, this is all  
11 covered in the correspondence. But we raise  
12 it because I think it is something that brings  
13 into some question about what was happening on  
14 the ground and whether the dosimetry was  
15 adequate or not.

16           And, I think this is almost one of  
17 these clarification issues as to what NIOSH  
18 and its evaluation would say, as far as this  
19 question on the neutron dosimetry and whether  
20 they have looked into that particular debate  
21 and whether or not that causes some concerns  
22 about the adequacy of how the measurements

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1 were reported for the operations.

2 And, Ron, do you want to go through  
3 the, I guess the correspondence, just to kind  
4 of lay it out a little bit better than that.

5 DR. BUCHANAN: Okay, this is Ron  
6 Buchanan with SC&A, for you on the phone.  
7 Okay, I want to lay a little background again,  
8 for neutron dosimetry and it's complicated  
9 compared to photons. And so there's really  
10 kind of two issues here at Brookhaven.

11 Number one is the adjustment  
12 factors or compensation factors or quality  
13 factors, what you want to call it, they use  
14 through the years and how those were  
15 addressed.

16 And, secondly, is the debate over  
17 being able to sort out the assigned dose taken  
18 from '85, to '95. So, first of all, let's  
19 cover a little bit about dosimetry they used  
20 and the problems that they --

21 CHAIR BEACH: Ron, can I just stop  
22 you for a minute?

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1 DR. BUCHANAN: Yes.

2 CHAIR BEACH: We just lost two key  
3 people. Do we need another break? What do  
4 you think?

5 MR. KATZ: Who did we lose?

6 CHAIR BEACH: Joe and Grady. I just  
7 wanted to check, does anybody else need a  
8 quick break?

9 Five? Let's do that. Ron, I  
10 didn't want you to get started and not have  
11 Grady in the room. So, five minutes.

12 (Whereupon, the above-entitled  
13 matter went off the record at 10:31 a.m. and  
14 resumed at 10:37 a.m.)

15 MR. KATZ: Okay, back on the record.  
16 Ron is just about to do the neutron thing.

17 DR. BUCHANAN: Okay, this is Ron  
18 Buchanan, SC&A, again. We're going to cover a  
19 little bit about the neutron dosimetry at  
20 Brookhaven, so that we can understand some of  
21 the questions we had.

22 Now at Brookhaven they had proton

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1 accelerators mainly up through '95 or 2000 or  
2 so. Proton accelerators create neutrons and  
3 so one of your external dosimetry problems is  
4 neutrons at proton accelerators. Now, later  
5 on they switched to a lot of heavy ions or ion  
6 accelerators which doesn't create as many  
7 neutrons.

8 They still have the 200 MeV proton  
9 accelerator, I understand, operating. Now,  
10 the neutron dosimetry at Brookhaven used NTA  
11 film, which we discussed in length yesterday  
12 at the Mound meeting, from 1950 through 1995.

13 Kind of late in the game, but they  
14 didn't switch to TLDs until 1996, for  
15 neutrons, which is kind of unusual, but that  
16 was their choice.

17 And then they used, NTA film, they  
18 realized suffers from two problems. Number  
19 one, at low energy it misses some of the  
20 neutrons, which we talked about yesterday in  
21 detail for Mound. At high energy it also  
22 starts missing some of the neutrons.

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1                   It's good from about 1 MeV to about  
2   14 MeV.    NTA film is one of the best  
3   detectors.   Above and below that, then you  
4   have to be concerned.   And so above 14 to 20  
5   MeV of neutron energy, BNL used CR-39.

6                   I see there's a misprint on Page  
7   19, that should be 39 instead of 29, which is  
8   a track etch detector for plastic and they  
9   used Lexan, which is also a plastic material,  
10   from '85 to '97.

11                  And so we have two areas to  
12   address, the low energy neutrons and the high  
13   energy neutrons that NTA film doesn't cover  
14   well.

15                  Now, a little background on, when  
16   accelerators were first developed, especially  
17   in the '60s and such, like at Brookhaven, when  
18   they started out with the first one, they  
19   didn't know for sure what the neutron energy  
20   was.

21                  And some of the references that are  
22   documented there say that.   They really

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1 weren't sure what was the best quality factor  
2 to use.

3 In other words, if you measure a  
4 certain amount of dose rads how do you convert  
5 that to rem and dose equivalent. And so it  
6 elevated the radiation biological  
7 effectiveness or quality factor, later.

8 And so they said, well, let's use a  
9 -- in 1965, one of the references said, well,  
10 let's use a quality factor of ten to carry  
11 this, because we know we're missing some  
12 neutrons at the lower energy, we're not sure  
13 what the quality factor of the energy spectrum  
14 is, so let's use a quality factor of ten.

15 And they did some rough  
16 calculations and say, well, this is a safety  
17 factor for the worse case condition at 2.4 or  
18 something like that, so we've covered the  
19 bases.

20 Later on then they added the larger  
21 accelerators which on the Van de Graaff and  
22 the proton accelerator fed into some of these.

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1 And it's a complicated accelerator system, so  
2 I don't know all the details of it.

3 But then they started generating  
4 some higher energy neutrons. So they said,  
5 okay, we might have a problem there with NTA  
6 film because above 14 to 20 MeV the neutrons  
7 start interacting with the carbon and oxygen  
8 causing spallation reactions, and so we lose  
9 our proton recoil and so we have to use some  
10 other type of dosimetry.

11 So they use CR-39 and Lexan. And  
12 this went on, the debate that we're talking  
13 about, went on between '85 and '95, because  
14 Landauer was doing their dosimetry, their  
15 processing.

16 Now, so let's address first of all  
17 the quality factor of ten. I guess what SC&A  
18 has a problem with is that yesterday on Mound,  
19 we went through in detail on fading, we went  
20 into detail on lower energy neutrons.

21 And it appears that Brookhaven  
22 said, oh, we used a quality factor of ten. We

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1 used ten millirems per track recorded,  
2 millirems per prong.

3 And, you know, kind of cover  
4 everything. So we don't see that it is broken  
5 down in the TBD or the ER, to what, that this  
6 RBE ten was appropriate or ten millirems per  
7 track, quite covered.

8 And the only end result was that  
9 the bias and uncertainty table given at the  
10 end of TBD-0006, says use an uncertainty  
11 factor and a quality factor, which I indicated  
12 in table 2 on page 21 in my report, using a  
13 bias of 1.35 and an uncertainty of 1.5.

14 And then it has some footnotes  
15 there about energy levels uncertainty. And so  
16 we don't feel that there's been a quantitative  
17 effort put into determining what a dose of  
18 record actually represents and what the  
19 quality factor covers and what the bias and  
20 uncertainty factor covers.

21 Now, I did do some analysis of the  
22 claims. As of about a year ago, we had five

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1 claims that had neutron data on it, and the  
2 dose reconstructor only one time used these  
3 uncertainty factors and bias factors, in the  
4 dose.

5 They did do the ICRP conversion, as  
6 recommended, but not the others. Which is not  
7 the fault of this group, but I'm just saying  
8 that it's unclear that the dose reconstructor  
9 understands what's recommended in the TBD-0006  
10 as far as that goes.

11 Now, the, so at lower energy and  
12 fading, you know, was not addressed really in  
13 the TBD or in the ER. Then the, and what  
14 calibration sources?

15 They did go to a two-week exchange  
16 cycle to decrease the amount of fading. But  
17 it's like we talked about Mound yesterday,  
18 what was the calibration?

19 Was that moderated neutrons or  
20 source, what was that, to use, so are we  
21 sufficiently covered for fading and lower  
22 energy neutrons that were missed by the NTA

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1 film.

2 At higher energy, I realized that  
3 neutron dosimetry above 20 MeV is still an  
4 arc, it's still evolving somewhat. However,  
5 there was measurable amounts of neutrons above  
6 the NTA film response on table 3 on page 24,  
7 lists some measurements that were made at the  
8 AGS accelerator in 1985.

9 And in red, and on the black and  
10 white copy, it's the lighter numbers. It  
11 shows the position around the working end, the  
12 target end of the AGS and the mean neutron  
13 energy measure and the dose equivalent above  
14 or below certain energy thresholds.

15 And we see that dose equivalent  
16 there, in the last column. The percent sign  
17 shouldn't be in there. No, the percent sign  
18 is correct.

19 KeV and MeV, okay, what percent is  
20 above that KeV and how much, what percent is  
21 above that MeV. So we see that quite a few of  
22 the neutrons, it isn't a negligible amount of

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1 dose equivalent.

2 Now, yesterday we were talking  
3 about a certain energy, it isn't very  
4 important. Well, that isn't the case in  
5 higher energy neutrons.

6 As you get higher energy they  
7 become more effective at creating doses. And  
8 so we see that the dose equivalent, above 115  
9 MeV, is greater than ten percent position one  
10 and so on and so forth. And so it is  
11 important, a significant amount of dose at a  
12 high energy accelerator at Brookhaven, is due  
13 to higher energy neutrons.

14 And so is it something? Maybe ten  
15 percent of the dose equivalent is -- say that  
16 that's covered by our quality factor or  
17 uncertainty factor.

18 And so I went through the text here  
19 and explained something, but the main gist is  
20 that we do have a substantial amount of dose  
21 above the NTA sensitivity.

22 And so this is what prompted these

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1 examples. What I did is went back and pulled  
2 out some of the documents on Brookhaven and  
3 the exchange of memos that went back and forth  
4 between the people, the health physicists and  
5 such that were concerned about this, between  
6 each other and Landauer, and apparently they  
7 did some experiments.

8 They call them runs. In these  
9 examples that they tried to measure and  
10 compare the NTA -- because the question was,  
11 at that time, should we use NTA response?

12 Should we use the CR-39 response?  
13 Should we use a Lexan response? Or some  
14 combination thereof? So that's what they were  
15 working through.

16 And unfortunately there is no one  
17 detector that works good for high energy  
18 neutrons, and so they use different  
19 combinations.

20 And the problem is they didn't get  
21 matching results. One, they send the  
22 dosimeters, the exposed dosimeters to Landauer

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1 and they get data back that read high doses  
2 for people that were on vacation.

3 And then they get low doses for  
4 somebody that was working in an experimental  
5 area. And they couldn't get Landauer to  
6 respond to this problem.

7 And so this brings up an accuracy  
8 of neutron dosimetry that is documented for  
9 '86, through '95. Now perhaps there was  
10 problems before, perhaps there were problems  
11 afterwards.

12 Like I said, a lot of this might  
13 have went away when they started using mainly  
14 ion, heavy ion acceleration, but you still had  
15 your 200 MeV proton accelerator.

16 And so, I won't go through all  
17 these examples. I list them on Page 25  
18 through 28, and then I summarize them in the  
19 spreadsheet in the back in Appendix D, that  
20 lists, no, that's Appendix C.

21 In Appendix C, list kind of a time  
22 line of what dosimetry would give you where

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1 and some of the problems that exist. And  
2 those example numbers are explained in here,  
3 and then I gave the reference number, so you  
4 can look up and see what the dialogue was.

5 And so, at this point, SC&A does  
6 not find that the neutron dosimetry at BNL has  
7 been quantitatively investigated to be  
8 accurate.

9 It may be, but it has not been  
10 worked on like the Mound was or Rocky Flats  
11 was to show it was.

12 And that the high energy neutron  
13 issue is still somewhat open. I don't see  
14 that these problems were resolved. Maybe they  
15 were, but I couldn't find documentation that  
16 they were.

17 CHAIR BEACH: Okay, thank you. Any  
18 questions for Ron or any additional  
19 information?

20 MR. CALHOUN: Unless anybody on the  
21 phone has any comments on that, maybe we can  
22 just add a little bit more detail.

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1 DR. MAURO: Ron, I have one  
2 question. Most of your discussion went toward  
3 the interpretation of the results of the  
4 neutron dosimetry that came back from Landauer  
5 and what it really meant. What about the  
6 coverage? I missed, I was out of the room  
7 when you started the discussion.

8 Is there any areas where you felt  
9 that people were not monitored for neutrons  
10 when they should have or is there good  
11 evidence that people were, in fact, badged,  
12 that should have been badged?

13 DR. BUCHANAN: From the information  
14 I've looked at and the type of accelerators  
15 these were and having worked with  
16 accelerators, I did not find indication that  
17 badging was a problem, as far as should they  
18 be badged?

19 There wasn't, seemed to be an  
20 oversight or lack of badging, it's mainly the  
21 persons that were badged were they, was the  
22 dose of record quite what they were exposed

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1 to?

2 And can we resurrect a realistic  
3 dose from that.

4 MEMBER ROESSLER: I have a question  
5 as to the extent of this. How many buildings  
6 or facilities at BNL was this actually, was  
7 there actually a need to monitor neutrons?  
8 It's kind of different.

9 I'm wondering if there's a subset  
10 of the various operations there that where  
11 this is applicable.

12 Because it's not like contamination  
13 where you have to worry about workers going  
14 from one facility to another. I mean this is  
15 just production of neutrons and anybody who's  
16 in the building has a potential for exposure.

17 But you wouldn't then, in another  
18 building where it's not a problem. So I don't  
19 know, you know, the, I don't know the facility  
20 well enough to know how many places this would  
21 be a potential problem.

22 DR. BUCHANAN: Well, I think that

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1 TBD-0002, does outline some of this,  
2 facilities and what radiation was present  
3 there. But, just briefly, for the time period  
4 we're talking about, that you would have the  
5 lower energy neutrons, perhaps at the high  
6 flux reactor which would be operators,  
7 experimenters and maintenance people and stuff  
8 there.

9           You, at the accelerators, the  
10 accelerator is a complicated layout, okay.  
11 You have a, it's a fenced in area and so you'd  
12 have anybody working in the, that went into  
13 that area, would be subject to neutrons.

14           Either working around the  
15 experimental area, around the accelerator or  
16 from sky shine, from reflected neutrons back.

17       So you'd have some environmental neutrons  
18 sort of sneak in that area.

19           And so you would have a -- and  
20 Brookhaven is known for, their main thing is  
21 the accelerator and so you would have a  
22 substantial, I wouldn't say a lot of people,

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1 but you'd have a fair number, percentage of  
2 the workforce that would be in that area on a  
3 daily basis.

4 Because you had Van de Graaff  
5 accelerators. You had linear accelerators.  
6 You had circular accelerators. And so it  
7 wouldn't be just a small group by itself in  
8 one building. It encompasses a large area.

9 Now, I mean, the percent, the  
10 number of workers, I don't know. But it's  
11 something that would need to be badged, and  
12 the people that went in there, I'd have to  
13 verify it, but I believe they were badged with  
14 neutron badges if they went into the  
15 accelerator area.

16 MEMBER ROESSLER: So I think you're  
17 saying it was a subset?

18 DR. BUCHANAN: Of the total  
19 population, yes. Yes, and people, and there  
20 was chemical and other research going on, that  
21 wouldn't be subjected.

22 Only if you went into the

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1        accelerator or reactor area, would you require  
2        a neutron badge or maybe the calibration  
3        facility.

4                    MEMBER ROESSLER: Then my second  
5        question is it seems like you looked into a  
6        lot of this, but you still have a lot of  
7        questions about, you know, the things that  
8        didn't match the people who worked in the  
9        facility apparently had low numbers and people  
10       on vacation didn't.

11                   It seems there are a lot of  
12        questions there and I think it would be valid  
13        to, again, interview people who currently  
14        maybe even work there or who worked there  
15        during that time.

16                   And I see a name in here, in the  
17        report here that, it just seems you could  
18        explore a little further to get their answers  
19        to some of these questions.

20                   DR. BUCHANAN: Yes, that's a  
21        possibility.

22                   MR. FITZGERALD: During the Site

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1 Profile we did interview people that were  
2 associated with that debate, you know, that  
3 were named in some of these memos.

4 The problem is they acknowledge  
5 that there was a problem and they were going  
6 back and forth. And what we're trying to find  
7 is what was the resolution.

8 And what did you finally get to?  
9 And that's where it got a little fuzzy,  
10 because I think they were converting to, you  
11 know, to final dosimetry.

12 And I get the sense that no one  
13 really had a fix on what happened to that  
14 debate. They were aware of it, they were a  
15 part of it, in some cases, but there was  
16 nobody that could tell us what the heck the  
17 resolution was.

18 And we looked for some paper on  
19 that, too, but again it was sort of, you know,  
20 we had the issue, we had the correspondence,  
21 we couldn't find the closure on it, which was  
22 troubling.

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1                   And we actually did interview  
2 several of the people that are named there and  
3 we couldn't get a good, clean answer on it.

4                   MEMBER ROESSLER: And are those  
5 interviews on the record?

6                   MR. FITZGERALD: Yes.

7                   MEMBER ROESSLER: Because then I  
8 just need to look at it.

9                   MEMBER MUNN: That was a period in  
10 time, though, when the whole complex was  
11 wringing their hands about which way to go.

12                   This wasn't a Brookhaven issue,  
13 necessarily, except that as a national  
14 laboratory, the personnel there would have  
15 just naturally felt that it was their  
16 responsibility to work this out, one way or  
17 another.

18                   So the debate might have been  
19 hotter.

20                   MR. FITZGERALD: Yes, and the sense  
21 we got looking at the correspondence was the  
22 frustration on the part of the research staff.

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1 The very, fairly renowned HPs who were  
2 dissatisfied with the vendor, because they  
3 kept getting, you know, getting the answers  
4 back that they knew weren't appropriate.

5 And so they were going back and  
6 forth and trying to get them to be responsive.

7 Even talking about bringing it back inside  
8 the lab, as opposed to outsourcing.

9 So there was just that kind of a  
10 problem, as well.

11 MEMBER MUNN: Which might have been  
12 a better thing, had it happened.

13 DR. MAURO: Is there any benefit to  
14 interviewing Landauer people involved?

15 MR. FITZGERALD: Well, I think, you  
16 know, again, you know, with a Site Profile you  
17 go as far as you can go and then sort of, you  
18 know, just put the issue up and tee it up.

19 Now we're in a focused review, we  
20 have two issues, one of which is this. I  
21 think we have a better mandate to bore in and  
22 focus in on the issue from an SEC standpoint.

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1           So, I think it would be appropriate  
2           to follow up, much like what Gen was saying,  
3           and try to find more people and make it a full  
4           investigation of that particular issue, which  
5           we didn't, you know, in the Site Profile we  
6           did not do.

7           We characterized it as a potential  
8           question or issue, and left it at that.

9           DR. BUCHANAN: I think that the  
10          introduction of TLDs in '96, kind of,  
11          everybody kind of fought this back and forth  
12          for ten or 11 years, and then it got kind of  
13          dropped when TLDs were introduced in '96.

14          They had gained some experience on  
15          the neutron dosimetry and moved on from there.

16          And so it was just kind of left there, I  
17          think.

18          From the documents I've received,  
19          Landauer wasn't responsive. They went back  
20          and forth, no resolution and they moved on to  
21          the next thing.

22          And so that's a point that we are

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1 at.

2 MEMBER ANDERSON: The question is  
3 are those valid records and results during  
4 that ten year period? When they moved on to a  
5 new measurement technique, there was no reason  
6 for them to pursue further trying to figure  
7 out what happened. It was already too late.

8 DR. BUCHANAN: And as a DR question  
9 is what do we do with the data that is  
10 recorded? Is it useful? Can we make  
11 corrections for it?

12 If not, is that an SEC issue?

13 MEMBER ANDERSON: Is the anticipated  
14 exposure enough that it would be a significant  
15 contributor in some individual cases?

16 DR. BUCHANAN: Yes.

17 MEMBER ANDERSON: I mean it's an  
18 interesting scientific issue, but if the  
19 exposures were --

20 MEMBER ROESSLER: Well, and we face  
21 that all the time. I think we have to  
22 recognize it and grab onto that too. Was the

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1 exposure significant that we were willing to  
2 pursue it?

3 MEMBER MUNN: The feeling at the  
4 time, as I recall it, is that quality factor  
5 of ten ought to cover any shortcoming in the  
6 measurement techniques.

7 And I was hearing Ron saying he  
8 didn't think that was so in a couple of cases  
9 that he was looking at, at the table.

10 DR. BUCHANAN: Well, yes, because,  
11 to expand on that a little bit, I don't know  
12 if it's so, you know, whether it would cover  
13 it all. But the problem is even if you use a  
14 quality factor of ten, if you're missing  
15 neutrons registering on the film, either at  
16 low energy or high energy, no quality factor  
17 is going to compensate for that.

18 And when you look at the chart I  
19 put in there, the percent of dose equivalent  
20 above the 20 MeV is substantial. At some of  
21 the locations the actual measure, I mean in  
22 this case we do have some field measurements.

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1 DR. MAURO: For the actual dose  
2 reconstructions that were performed, where  
3 neutron dosimetry was estimated, using the NTA  
4 film, given all of its limitations, was the  
5 contribution to the dose experienced by the  
6 worker dominated by neutron exposure?

7 So to answer the question that  
8 Henry just asked, is, you know, are we seeing  
9 neutron exposures, even though they're flawed,  
10 might be flawed, are they important, from the  
11 ones we looked at.

12 MEMBER MUNN: It would seem unlikely  
13 that they would be the driving factor, in view  
14 of the fact that it only is applicable when  
15 the machine is up and running.

16 It's not up that much. Once you  
17 hit the switch then neutrons are no longer an  
18 issue.

19 DR. BUCHANAN: Now, I did look at  
20 that and the number claimed at neutron dose  
21 reconstruction was limited, okay. And the,  
22 and I have it somewhere in here, but I won't

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1 take all the time to dig it out.

2 But I looked at the neutron  
3 contribution and it wasn't non-significant.

4 DR. MAURO: It wasn't non-  
5 significant.

6 DR. BUCHANAN: Right, yes.

7 (Laughter.)

8 DR. BUCHANAN: At any proton  
9 accelerator you're going to have a neutron  
10 dose that is similar to your photon dose,  
11 okay? And it's not going to be a hundredth of  
12 it or something like that or a hundred times.

13 It's going to be around, your  
14 photon dose, if that person is exposed to just  
15 the operating -- you know. Now, if he's a  
16 maintenance worker that goes in a tunnel after  
17 it's shut down, he's going to be mainly photon  
18 dose.

19 But if it's an operator or  
20 experimenter that works around during the  
21 operation of the accelerator, you're going to  
22 have a neutron dose that is somewhat

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1 comparable to the photon dose.

2 DR. MAURO: One more question  
3 related to that. I guess, I'm not familiar  
4 with accelerators but when it's on, everyone  
5 is aware, this is a very serious situation.

6 And you have controlled access, you  
7 have interlocks, you have shielding. But  
8 also, I presume, that in the areas that are  
9 being occupied, that beside the fact that  
10 they're wearing NTA film, I know that there  
11 are various devices that are survey  
12 instruments to characterize the neutron field  
13 in potentially occupiable areas. Was there  
14 like mapping that is when this machine is on,  
15 outside of the controlled, where the area, the  
16 accessible area is where the workers might be,  
17 a control room, for example.

18 Were there special investigations  
19 to understand the radiation field that is in  
20 place, at the time the machine is on, so that  
21 you understood what the, because I know you  
22 were talking about, these machines certainly

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1 would produce.

2 And when the accelerator strikes  
3 the target, you've got this now. But then, of  
4 course, outside of that location, what  
5 actually makes it out where people might be?

6 DR. BUCHANAN: Your photons and  
7 neutrons.

8 DR. MAURO: You do get photons, but  
9 the energy distribution.

10 DR. BUCHANAN: Yes, they did that --

11 DR. MAURO: They did do that?

12 DR. BUCHANAN: And also, at  
13 Brookhaven the energies are high enough, you  
14 had muons on the outside too, which you  
15 generally don't experience in health physics.

16 But the muons are low LET, they  
17 rest here on the photon field. I did have  
18 some problems with Landauer correctly  
19 measuring the muon dose, but it wasn't  
20 substantial.

21 So, outside the shielded  
22 accelerator while you're operating, you've got

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1 your photons and your neutrons. And they did  
2 have, and I'm not sure of all the systems at  
3 Brookhaven, but they did have a thing called  
4 the Chipmunk they did use to do surveys with.

5 And I presume they had area  
6 monitors of those sitting around, you know.  
7 So there was, you know, not really questioning  
8 the health physics control around accelerators  
9 and stuff and, in fact, you know we think they  
10 did health physics, they were identifying  
11 these problems. You know, they weren't just  
12 taking the NTA value from Landauer. And they  
13 did do measurements to show that their  
14 instruments measured something and Landauer --

15 MEMBER ROESSLER: I think what John  
16 is suggesting, though, is something comparable  
17 to before when he talked about air monitoring  
18 in lieu of bioassay, is there some monitoring  
19 going on when the machines were on, that would  
20 serve as a to do dose for those workers, even  
21 if that film badge or the other badges were  
22 not adequate.

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1 DR. BUCHANAN: Not, not.

2 MEMBER ANDERSON: Can we bound the  
3 exposure?

4 MEMBER ROESSLER: Is that what you  
5 were getting at?

6 DR. MAURO: Well, I wanted to get a  
7 better understanding, because I know when you  
8 talk about these machines and what they are  
9 capable of producing, but what is actually  
10 being experienced where people are, are two  
11 different things.

12 DR. BUCHANAN: You don't have  
13 spallation products and charged particles  
14 impinging on the workers outside the shield.

15 DR. MAURO: That's where I was  
16 headed. But now, I didn't intend my question  
17 to be that, but I like what you, where you  
18 took it.

19 In other words, here's the way to  
20 get a handle. Here's where you can get a  
21 handle on how serious a problem might have  
22 been.

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1           Apparently, the research is more  
2 serious. The debate that occurred between  
3 Landauer and the researchers probably emerged  
4 from the fact that they had reason to believe  
5 that we're dealing with very high energy  
6 neutrons and other emissions in a potentially  
7 occupiable area.

8           That the NTA film or the other  
9 dosimeters that were used, were not going to  
10 be very adequate. So, but the hook on this  
11 problem might be, okay, what was the field  
12 that might have been there and what adjustment  
13 factors you might need to make to -- in a  
14 claimant favorable way to the NTA film  
15 readings that, and so the hook for solving the  
16 problem might be these surveys that were taken  
17 with these -- whatever the detector was.

18           That would have captured what  
19 these, the neutron exposures at these high --  
20 I'm presuming that, you know, the Bonner  
21 sphere with a shield.

22           If you had a 10 MeV or 20, whatever

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1 the neutron, I don't know what made it out.  
2 I'm not sure how they would know the spectrum.

3 I guess that's my question, I'm not  
4 quite sure. Do they know what the spectrum  
5 was outside in potentially occupiable areas?

6 DR. BUCHANAN: Yes, they did, they  
7 did a pretty good job of that and that's the  
8 way this table 3, I had in here, listing the  
9 dose as a function of energy above a certain  
10 MeV, they use a Bonner sphere.

11 So they did characterize the film  
12 and that's the reason they were able to say,  
13 to use these different dosimeters and say,  
14 Landauer, you're missing the boat, and that  
15 sort of thing.

16 Now, but you have to, accelerator,  
17 you have to depend on this type of  
18 experimental measurements to do any conversion  
19 of recorded dose, meaningful dose, an area  
20 monitor and accelerator is only a gross  
21 indicator.

22 If they've got one mounted on the

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1 wall. It kind of tells you if it's going up  
2 or down.

3 But there can be a crack over here  
4 100 times more than that up there. And in  
5 experimental -- you've got experimental blocks  
6 and stuff shielding it.

7 So as far as reconstructing a  
8 worker's dose, area monitors are not very  
9 practical.

10 DR. MAURO: So that may not be the  
11 hook, okay.

12 DR. BUCHANAN: And the experimental  
13 data is what would enable us to go back and  
14 say, okay, this is the energy spectrum and you  
15 can even say this is the worst case they  
16 measured.

17 And so we multiply the dose by a  
18 certain factor and so we can put a limit on  
19 what the person will get.

20 MR. FITZGERALD: The energy spectrum  
21 in the occupiable space -- I mean it's modeled  
22 for what would be in fact an occupational

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1 exposure.

2 DR. BUCHANAN: Right.

3 MR. FITZGERALD: So it's very much  
4 relevant to this.

5 DR. BUCHANAN: Usually done at three  
6 or four feet above ground level. It's usually  
7 done at the pace a person can get without  
8 breaking the interlock.

9 MR. FITZGERALD: Right.

10 DR. BUCHANAN: And it's usually done  
11 at, say, a junction of the shielding or  
12 something, where you might get screening.

13 And so, knowing the people that  
14 work there, these were probably good  
15 measurements.

16 MR. FITZGERALD: Yes. Which gets to  
17 your point, I think. This is really where the  
18 worker would be.

19 DR. MAURO: Where the worker is.

20 DR. BUCHANAN: And you can look up  
21 on this where I got this data. They actually  
22 make a diagram of the accelerator and the one,

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1 two, three, four, five, 17 points around.

2 DR. MAURO: So what I'm hearing is  
3 that you would have liked to have seen in the  
4 Evaluation Report, a development of the, a  
5 narrative explaining this issue and the way,  
6 the strategy that those NIOSH proposals as  
7 being guidance to the dose reconstructor on  
8 dealing with these issues.

9 That's not there.

10 DR. BUCHANAN: All the way back to  
11 TBD-0006. And I think TBD-0006 needed this  
12 information. Because the dose reconstructors  
13 left without any real feel for what he's  
14 supposed to do.

15 MR. FITZGERALD: Just a footnote  
16 that we just, in the Site Profile review, did  
17 not get to the bottom line of the resolution  
18 and how it was recorded.

19 So that piece we were trying to  
20 find out, but again we couldn't find that out.

21 DR. BUCHANAN: And TBD and the Site  
22 Profile review, we did identify these

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1 problems. And then we went back for the SEC  
2 and you did a finer combing of it and a more  
3 logical sequence of events.

4 Because it takes quite a while to  
5 go through these memos and see who is saying  
6 what to who over this ten or 11 year period.  
7 So, it gets kind of wound up if you don't go  
8 through and filter it all out.

9 CHAIR BEACH: So the action item  
10 that I gathered from this is that NIOSH needs  
11 to go back, look at SC&A's concerns and then,  
12 and you would owe a White Paper or something  
13 on neutrons to the Work Group at some time.

14 And that's the only action I have,  
15 other than maybe clarifying questions if you  
16 have, for SC&A on some of their questions.

17 DR. BUCHANAN: And the interviews,  
18 should we consider --

19 MR. FITZGERALD: And the interviews,  
20 and we can certainly --

21 CHAIR BEACH: Thank you, I didn't --

22 MR. FITZGERALD: The interviews plus

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1 the names of the individuals that were  
2 relevant to this issue, we talked to.

3 CHAIR BEACH: And that would be an  
4 effort between both SC&A and NIOSH, hopefully,  
5 to interview together?

6 MR. FITZGERALD: Yes.

7 CHAIR BEACH: Yes, it seems  
8 reasonable. Hopefully, definitely coupled  
9 with the other set.

10 MR. CALHOUN: Leo, do you have any  
11 input on that?

12 (No response.)

13 MR. CALHOUN: No wonder he doesn't  
14 have any input on it.

15 MEMBER ANDERSON: He's not there.

16 MR. FAUST: I can't talk with mute  
17 on, I guess.

18 MEMBER MUNN: Oh, you can, but we  
19 can't hear you.

20 (Laughter.)

21 MR. FAUST: Okay. Anyway, I think  
22 Ron has pretty well laid out some of the

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1 problems that we were kind of aware of when we  
2 first put this TBD together.

3 And I'll be the first one to admit  
4 that there's some holes in it. Mostly because  
5 we couldn't find any data at the time.

6 But, I think right now we should  
7 do, we could answer some of those questions  
8 much better if we relooked at it. That's  
9 about all I can say right now.

10 CHAIR BEACH: Sounds good.

11 MR. FAUST: One thing I might bring  
12 up, we're kind of shying away from White  
13 Papers. We would rather, I think, answer this  
14 in the form of a formal report.

15 CHAIR BEACH: Okay.

16 MEMBER MUNN: Why are you shying  
17 away from White Papers?

18 CHAIR BEACH: What's the difference  
19 between a White Paper and this report?

20 MR. CALHOUN: It's because we  
21 haven't been able to reference them. When we  
22 come up with a White Paper, it's not quite as

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1 trackable.

2 And if we make it a formal report  
3 it's a trackable record in our little world.

4 DR. MAURO: You get a number. I  
5 agree with that.

6 CHAIR BEACH: That's perfect.

7 MEMBER MUNN: When the time comes  
8 when it's all electronic anyhow, the reference  
9 will be easy.

10 MR. CALHOUN: Yes, yes.

11 CHAIR BEACH: Yes.

12 MR. CALHOUN: For now that seems  
13 like a good approach.

14 CHAIR BEACH: Okay, so that takes us  
15 through the matrix. The next question for  
16 this Work Group is we were tasked with the  
17 Site Profile review and I guess, I know SC&A  
18 has a report on the table.

19 And my question will be to NIOSH of  
20 how much energy or where you are on the Site  
21 Profile review? The questions to SC&A's  
22 response.

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1                   MR. CALHOUN: Well, basically, it's  
2 going to be kind of a general response in that  
3 John just gave me, last week or two weeks ago,  
4 a list of outstanding items that you guys have  
5 that SC&A has.

6                   And we work with a really detailed  
7 chart to try to allocate our resources  
8 appropriately. And so we're trying to meld  
9 those.

10                   I've forwarded that information to  
11 ORAU last week or whenever, right after John  
12 had given it to me. And I believe that we're  
13 supposed to give you something, you, the  
14 Board, not just this Work Group, an overall  
15 outline of where we think this is going to be  
16 and how we can make these match our priorities  
17 as well as yours.

18                   I think by the end of this week.

19                   MR. KATZ: That's good.

20                   (Laughter.)

21                   CHAIR BEACH: So that's not a  
22 specific Brookhaven --

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1                   MR. CALHOUN: It will be. It will,  
2 no, it will be. It will be, it has to be. It  
3 has to be line by line so that --

4                   MR. KATZ: Not just Brookhaven?

5                   MR. CALHOUN: Yes, not just  
6 Brookhaven, right.

7                   CHAIR BEACH: So that will give us  
8 an idea of when to expect the report.

9                   MR. CALHOUN: Yes. Because what  
10 we're trying to avoid is, you know, somebody  
11 calls us and says we want to have a Work Group  
12 meeting next week.

13                   And we're like well, hell, this was  
14 never on our priority list and now we've got  
15 to go. Because we do have other things that  
16 we do.

17                   So, we're going to try to make  
18 those match now so that your expectations and  
19 our expectations are kind of in sync.

20                   CHAIR BEACH: Well, just history, we  
21 formed the Work Group almost a year ago. So I  
22 thought I was being --

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1                   MR. CALHOUN: It's nothing on you.  
2                   But there's times when we've had, you know,  
3                   we've had a Work Group scheduled, or not a  
4                   Work Group scheduled, but a Work Group  
5                   established and haven't had a meeting for  
6                   years, years.

7                   CHAIR BEACH: So, we'll wait for  
8                   that report on the Site Profile.

9                   MR. CALHOUN: Yes, yes.

10                  CHAIR BEACH: What about kind of a  
11                  time line for the action items from the matrix  
12                  for this meeting?

13                  MR. CALHOUN: Well, when would you  
14                  like to get back together again? That's  
15                  certainly how we should do this.

16                  MEMBER CLAWSON: Next week?

17                  CHAIR BEACH: It won't be until, it  
18                  won't be for me until after October, so, but  
19                  how much time do you need?

20                  MR. CALHOUN: Then we shouldn't need  
21                  that long, you know.

22                  CHAIR BEACH: Okay, so is anybody

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1 ready to pull calendars out or do we want to  
2 do that?

3 MEMBER MUNN: You can't do it in  
4 September?

5 CHAIR BEACH: No, I'm out of the,  
6 out of the country.

7 DR. NETON: Well, some of this  
8 neutron stuff, Grady, might take a while.  
9 It's very complicated.

10 MR. CALHOUN: Well, then we need to  
11 discuss with the guys who are going to do the  
12 work.

13 DR. NETON: I think we need to --

14 MR. KATZ: At the Board meeting.

15 DR. NETON: We'll be prepared at the  
16 Board meeting to provide some dates.

17 CHAIR BEACH: So, put the calendars  
18 away.

19 DR. NETON: I think there's  
20 substantial, probably, modeling efforts are  
21 involved in some of this neutron data.

22 MR. KATZ: That's okay.

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1 DR. NETON: I think we should wait.

2 CHAIR BEACH: That's fair.

3 MEMBER MUNN: For your information,  
4 Josie, Procedures is tentatively scheduled the  
5 13th of October, as their next meeting. So  
6 that middle week in October is one that we  
7 were thinking would be about the time people  
8 would start to meet again.

9 DR. MAURO: And along those lines,  
10 it's always convenient for us to, well, for  
11 me, to have them back-to-back. Have a  
12 Wednesday-Thursday, Tuesday-Wednesday-  
13 Thursday.

14 CHAIR BEACH: So before, if we're  
15 finished with Brookhaven, let's go ahead and  
16 adjourn this meeting, then. So this, consider  
17 we're adjourned.

18 MR. KATZ: We're adjourned. Thank  
19 you everyone on the line.

20 (Whereupon, the above-entitled  
21 matter went off the record at 11:19 a.m.)

22

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