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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON BROOKHAVEN

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THURSDAY,

FEBRUARY 14, 2013

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The Work Group convened telephonically at 3:00 p.m., Eastern Standard Time, Josie Beach, Chair, presiding.

MEMBERS PRESENT:

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

ALSO PRESENT:

THEODORE M. KATZ, Designated Federal Official
TIM ADLER, ORAU Team
ISAF AL-NABULSI, DOE
RON BUCHANAN, SC&A
ZAIDA BURGOS, NIOSH
GRADY CALHOUN, DCAS
JASON DAVIS, ORAU Team
JOE FITZGERALD, SC&A
JIM NETON, DCAS
GENE POTTER, ORAU Team
LAVON RUTHERFORD, DCAS
DENNIS STRENGE, ORAU Team

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

(3:00 p.m.)

WELCOME AND ROLL CALL

(Whereupon, roll call was accomplished.)

MR. KATZ: The agenda for the meeting, which is very, very simple, is posted on the website under the Board under Meetings for today. And I don't believe there are any documents posted for today. And let me just remind everyone on the phone to mute your phone except when you're speaking to the group. If you don't have a mute button, press *6 to mute and then press *6 again to come off of mute. Thank you, everyone.

CHAIR BEACH: Okay. Thanks, Ted. Good afternoon, everybody.

- DISCUSSION OF BASIS FOR BNL SEC CLASS END DATE

CHAIR BEACH: The purpose of this meeting today is to discuss the 1993 cutoff date for Brookhaven SEC. As you remember, the

1993 was the year BNL implemented a revised internal monitoring program and records were more centralized. SC&A sampling did raise some questions about the consistency and completeness of the bioassays, especially for the years 1994 through the end of 1996.

We have four pertinent documents for today's topic. The first one, if you go back to March 2012, was SC&A's evaluation of Brookhaven SEC-00196, the issue of the end date of 1993. The next memo was issued on 1-4-13. That was NIOSH's response to SC&A's memo.

And then we have a document that was issued on 1-10-13, SC&A's evaluation of the NIOSH White Paper. And then the next one was issued on 2-7-13. That was also a NIOSH paper. And then the last one we received was a response on -- I believe, Ted, you sent that out on the Wednesday, Tuesday or Wednesday of this week, which was SC&A's response embedded in NIOSH's paper.

So I am not sure at this point if SC&A wants to get started or NIOSH.

MR. FITZGERALD: Well, I think, you know -- Josie, this is Joe. I think we can walk through -- I mean, we have had iterative responses, but the main response was to NIOSH's White Paper from, I guess it was, January 4th. Is that correct? I believe it was January 4th.

CHAIR BEACH: Right.

MR. FITZGERALD: And our response of last month was put together by Ron Buchanan at the request of the Work Group mainly to deal with the question of -- you know, the '93 end date, which is the subject of this review, was based on a major programmatic change at Brookhaven, which was to centralize and make the -- certainly the bioassay records more rigorously maintained and available. And that benchmark or milestone was the basis.

And the Work Group asked SC&A for some means of validating that, in fact, the

records were more complete than they had been before '93. And Ron Buchanan had proposed and went ahead and developed a sampling exercise based on those workers who were deemed to be part of bioassays on a regular basis and see whether or not, in fact, those records were available for those individual workers.

I guess I think it would be useful to have Ron walk through the response that SC&A issued because that is basically the basis for our question regarding this '93 to '96 period.

You know, even though the programmatic change took place in '93, I think our concern is that from these sampled workers, we were still seeing a fair amount of fluctuation in terms of the completeness of their records. And this fluctuation seemed to ebb by the end of '96, and you see a pretty constant pattern thereafter. I thought the set of bar graphs that Ron presented in his presentation were pretty indicative of that.

So that is kind of where we are at at this point. Ron, do you want to add something?

DR. BUCHANAN: Well, I can go through a summary because I don't know if everyone is aware of -- you know, it's been a year or so since we discussed this. I think it would be advantageous for me to just go through why this was done and the results and the limitations of the result if that would be okay.

CHAIR BEACH: Yes. Ron, this is Josie. I think that would be a great idea. Thank you.

DR. BUCHANAN: Okay. And so, just to elaborate a little bit on what Joe summarized pretty well and to give you a little more detail on the background of this, Brookhaven, as you know, is a research lab and always has been. And it did not lend us the luxury of having a production facility there that -- even like Los Alamos or Oak Ridge,

they didn't have anything there long term that you could say, "Well, you know, these workers probably should have been bioassayed."

And so when this came up in that they implemented a centralization of the bioassay records in the early '90s, this was good, but then we wanted to see, you know, if the results were actually there.

And so I looked around the lab and looked at its history and its operation and everything in the '90s because this was a period of transition from 1990 to '99 and to see where I could find some facility that would indicate that they would require a bioassay or may require a bioassay. And this is fairly difficult with Brookhaven because they are diverse and changing manifest.

And so the accelerators, of course, think they're in pretty much high-energy, low-current. So you don't have a lot of bioassay requirements there. A lot of the other things were just short campaigns or

research projects. The only thing I could really find that would give us any indication of some routine requirements that we could look back from today on was the high-flux beam reactor that operated here in the 1990s.

And so what I did is I went in and looked at some people. Of course, you had to have claims for them so that we could look at the records. And I could only find five people that worked at the reactor, had claims, and had titles that would indicate that they might fall into the requirement of having bioassays.

And these five claims worked there. Three of them had job titles that would indicate they worked there pretty steady at a job that would indicate bioassay requirements. And there was a publication in the early '90s saying when bioassay requirements should be performed or when they should be performed when they started implementing this in bioassay programs.

So they fell under that. Now, again, it isn't a hard and fast thing judgment what the worker title is that they might need. So it was a total of five. And three out of those five would indicate that they would need bioassay.

So what I did is I looked at these. Now, I would like to explain right up front this is a very small sample. I normally would go look for other or use other bigger samples if it was available, but this was just a small snapshot into, you know, a bigger picture that we really don't have a full picture of it because we don't know what all required bioassay there because there was a lot of short-term work.

And so this was what I used to look at the record completeness. And that's our subject here, is record completeness and availability for today's dose reconstructions.

And so I initially did this about a year ago. And that is where your figures 1A

and 2 and 3 and 4A come from. And then I issued that last spring. And then Brookhaven apparently came around and got a better system together to give NIOSH the data. And so they filled in some of the gaps that were missing.

And so when I reworked this very recently, I went back to the DOE files to see if there was more data available for these five workers that I was concerned with. And so that is the B figures. The A figures are last year. The B figures are this year. And so we really can't use A figures because that data has been superseded by the B figures. So we are looking at 1B. And I just put in the A figures to show how much difference it made in case someone was wondering, how much difference this means for these five workers for being held together, their program, and make it more useful to NIOSH for dose reconstruction.

And so in figure 1B, we have -- I broke it up into tritium and whole body. I

looked at the monthly tritium bioassay. And, say, if they were bioassayed every month for a year, then that was 100 percent. If there's six months out of a year, that's 50 percent. And I did that for the five workers, and then I did it for the three workers that we were pretty sure should have bioassay. The other two might have been questionable if they changed jobs or worked in the target area or something like that.

And so that's the reason that we have this separated up into four plots. We have five workers for tritium. We have three workers for tritium of those five. And then we have whole body counts for the five workers, whole body counts for the three workers.

And so that is essentially what is one percent in those plots and to look at the trend. Now, really, this small a sample, hard and fast data, you know, it's hard to pin because it is just a few data points one way

or the other. But, you know, what I wanted to look at was a trend. Does this show that the bioassay records are available, you know, starting in '93, that there's not much fluctuation or how do they compare to the prior years in '93?

And so in 1B, there, we see this as a 5 workers' tritium. And we see that the years '94, '95 are lower than the years for '90 through '93. And then it's good, better, ranges 75 percent in '96 and levels out.

And then in 2B, this is the tritium for the 3 workers. We see a very similar trend, same thing, indication. And then in 3B for the whole body counts, we see a similar trend except that 95 looks better for the 5 workers. If we go to the 3 workers in 4B, we see that it is 97 before the whole body count fluctuations level out.

And so this is where we came up with a conclusion that is it a solid sampling a lot of workers and that? No. Is that

snapshot an indication that might raise questions. And are there fluctuations that they place? Yes.

And so I agree it is a subjective question as to when does the data patiently complete and when it is? But SC&A's being in -- the fluctuations do cause some shadow of doubt up to about '96.

And so I responded to Grady's comments. The most recent one was just a couple of days ago. I didn't really have time to get out an official paper on that. But, again, it is just reiterating our position and responding to each case that was discussed.

But I would like to emphasize again that you take the small number like just as a tool. The overall picture of the program was implemented. You had an implementation time. You had a work in process sort of thing. And then when did it kind of level out?

So that is our position at this time.

CHAIR BEACH: Thanks, Ron. This is Josie again.

Are there any questions for Ron?

MEMBER ROESSLER: This is Gen. Am I off mute?

CHAIR BEACH: Yes.

MEMBER ROESSLER: Okay. I was following Ron's figures as he was talking. And he did qualify that this is a very small amount of data and so on. I guess I'm trying to come up with from what he said -- what is the conclusion? What is SC&A recommending with regard to dates?

DR. BUCHANAN: Okay. Yes. This is Ron. What we would recommend was, instead of ending on December 31st, 1993, that the SEC end on December 31st, 1996.

MEMBER ROESSLER: Well, I have a hard time seeing that in the data because of the small sample and the fluctuations. At least I would like to hear some response from NIOSH on what their conclusion is with your

proposed dates.

MR. CALHOUN: Okay. This is Grady. I'll be glad to do that. Basically what I did was, first of all, we responded or looked at the first report from SC&A. And we wanted to separate out the SEC portion from the TBD section of that. So I really just looked at the five cases that were the subject of that report.

And Ron is right. BNL we have noticed through just our dose reconstruction process that we're receiving many, many more records than we used to. And, just to remind everybody, the SEC was established -- the first one is the 83.14 -- was established because we just felt that we weren't getting records. And one of the keys was that we were finding records that we had captured on our data capture trips that weren't being provided by Brookhaven.

Some of the recent submissions, it's routine for them now, but what they do

now is they'll go through. They do a hard copy search. They do electronic copy search. And they provide a much more voluminous response to our request.

After I looked at the first SC&A response, I rerequested data for four of those cases. I actually had written five, but we had one that was pretty recent. So I only requested it for four of the five cases. And we got very, very large responses back. And in no case did we still have data that they didn't provide. As a matter of fact, they provided data that we hadn't had up to that point. So that made me feel a lot better. And that is their standard operating procedure now for responding to our data request.

So I went through that. And I think Ron feels my pain. We have thousands of pages to go through for these five cases. So we went through these five cases. And I was trying to make a determination of whether or not the data was there, number one; and

whether or not they really were required to have been monitored. And the requirement is typically 100 millirem, the potential to receive 100 millirem, for a year.

My response went through case by case. And I had to take it a little bit simpler because the graphs are pretty, but I actually wanted to know what case and what piece of data from each case was missing that has caused concern. And Ron provided that to me.

And so I went through the five cases. And, you know, we can go through these case by case if you'd like. There are five of them. But in no case did I feel that either the person was monitored and the data wasn't there or that they should have been monitored and weren't monitored. And in all of these cases, I believe that the dose reconstruction can be completed.

And so that is where we stand. Like I said, if you want to go through case by

case, I would be glad to give you a synopsis of that.

MEMBER ROESSLER: Grady, when you say it can be completed, to what date? Give a date on that. I think we are talking about the question of ending the period in '93 or possibly extending it. So tell me when you say it can be completed --

MR. CALHOUN: I believe the current date of 1993, the end of 1993, is good still.

MEMBER ROESSLER: Okay. That helps. Thank you.

CHAIR BEACH: Okay. This is Josie again. Any other questions for Ron or Grady?

MEMBER CLAWSON: Josie, this is Brad. You know, I'm sitting here looking at this data, too. And wasn't it true that '93 is when they were supposed to have started -- and this is for Grady, I guess -- that they started this more centralized information centralizing it a little bit?

MR. CALHOUN: Yes.

MEMBER CLAWSON: I guess my thing is I say '94, '95, '96, there's a little improvement but not much. You know, like anything you implement, it takes a while to get that into the process because these people have been going for how many years now and haven't really been doing this good at recordkeeping or anything else.

And my question is, what are we going to be able to do with this data, say that we went with NIOSH, because to me a lot of this is just is the glass half full or is the glass half empty type of a process here. Are we going to build a coworker data to be able to use this with or what are we going to do?

MR. CALHOUN: In many of these cases -- well, there aren't many because there are only five, but we have data before and after some of these holes. So we would apply, like we typically do, mixed dates, mixed dose. Now, I don't believe there are holes. I

believe that people shouldn't have or didn't require monitoring. Let me go through an example.

One of the first cases -- we have an individual. And the issue was there was not tritium monitoring for '94 and '95. Okay? So that causes that draft to look bad in '94 and '95. The individual retired [identifying information redacted]. So I look back at all of his data. And he had somewhere along the lines of 12 to 15 tritium samples taken prior to 1994. All of them were zero. The vast majority of all the external dosimetry was zero. So that indicates to me that there was no need to monitor this individual past 1994 because the potential for 100 millirem wasn't there.

It just seems odd that the records were there since 1985 or 1989, I guess, all the way up through 1993 and then they would have stopped. So I believe that there was a conscious decision made to not monitor that

individual.

So that's why I had to take a more individualized approach and look at the cases and see what the person did and what the results of the dosimetry were that we had in hand and try to determine if I thought that necessitated some kind of thought that we wouldn't have data or that he was monitored and the data was missing or should have been monitored and wasn't. And that is just one of the five cases.

MR. FITZGERALD: Grady, this is Joe.

MR. CALHOUN: Yes?

MR. FITZGERALD: Just to clarify, you're saying that you would interpret that period of time as a period of time when he would not have or should not have been monitored, but we don't know for sure?

MR. CALHOUN: Right. I have no reason to believe he would have to be monitored. Based on all the other

documentation that I have seen, it is hard to believe that the records were there for '89, '90, '91, '92, and '93 and then, all of a sudden, they disappeared for the year and a half before he retired.

MR. FITZGERALD: Yes. I guess my point is we don't know. There's no way to corroborate that. We just would be forced to speculate as to what his status is?

MR. CALHOUN: What do you mean "what his status" was?

MR. FITZGERALD: Well, you're saying his records are missing for the last year, year and a half before he retired.

MR. CALHOUN: No. I don't think his records are missing because I have got a data drop also that is a computer printout of probably all of the people but many, many of the people at Brookhaven and when the dates of their tritium analysis were taken and what the results were. And they go well beyond 1995.

MR. FITZGERALD: So he is just not

in that listing?

MR. CALHOUN: This individual -- he is in the listing, but his end is in 1993. So it indicates to me that there was no monitoring of this individual. So I can't draw the conclusion that monitoring was performed and we don't have the data.

And the SEC is based on the fact that the data was missing. So in that specific case, there's no reason to believe that he was monitored and the data doesn't exist. It's more likely that the data -- he just wasn't monitored.

DR. BUCHANAN: This is Ron. I would like to inject on that case. He did have whole body count records for '94-'95. So that could be one way or the other to say, "Well, if you had whole body counts or didn't have tritium counts," usually tritium counts are easier than whole body counts. But then they did have the whole body count records. So that's another issue to consider for this

order, that he did have whole body counts for '94 and '95.

MR. CALHOUN: Right. And those whole body counts were used in dose reconstruction.

MEMBER MUNN: This is Wanda. You know, what we're talking about and who we are talking about here needs to be taken into consideration. This was, as has been pointed out, not a production facility, never has been. This is a facility that does not have a lot of casual workers wandering through, doesn't have people who are not truly prepared for and understand the projects they are involved in.

This is a clean facility. We don't think of it as -- we have seen it. And it never has been considered a dirty facility, like the production facilities are. We have people that we are talking about here who are claimants who are people who put together production programs. These are folks that are

acutely aware of when they should and should not be monitored. It's hard to imagine that they would have had any period of time that they should have been monitored when they weren't if for no other reason than the fact that, for the most part, I don't know these individuals. So I can't make that blanket statement, but I think you can make that blanket statement with regard to most of this particular laboratory's folks. They would certainly be aware of that.

If there were incidents where they should have been monitored -- and let's face it. A hundred millirems a year? Gosh, guys. That's a really low cut-off for the decision to have been made whether or not they were going to be monitored. But if they weren't being monitored, then it seems highly probable to me that neither the individual nor their project management felt that it was reasonable to do so.

So if you have decent records about

these folks and especially in cases where you have a whole body count and you know, therefore, that the concern for monitoring existed -- otherwise, there wouldn't be a whole body count -- it just does not seem rational that one would jump to the conclusion that there was a missing record or that they should have been monitored and weren't in this particular facility. It seems to me that there is adequate validity for the position that 1993 will give you the people that we need to be concerned about with regard to Special Exposure Cohort.

CHAIR BEACH: This is Josie following up on that. I was looking -- and I am going to refer to Ron's bar graph because that is a picture that I can look at. And I look at the record, and I am only looking at the figures 1B, 2B, and it looks to me like we have a percentage of workers that were bioassayed of the 5. And we are looking at numbers about 55 percent up to maybe 65

percent overall, 55 to 75 percent. What percentage of records are adequate to do dose reconstruction?

MR. CALHOUN: I think that it depends on what the exposure potential was. And in these five cases, it turns out that the people that were monitored -- if you look deep into their monitoring history and what they did, again, I see that in my mind, there is really no reason to believe that records are missing post-1993.

So in my opinion, I believe that we have all of the records that were there. And we certainly can tap the dose and do a dose reconstruction for these individuals, you know, in the event that there was a -- let's just say that there was a month or a year or whatever of tritium data or there was a month or a year where there was no tritium data, but there was data before and after, we would assign missed dose between those two points and the same thing with whole body counts.

You know, we can get the whole body counts from year to year.

And when you look at the graph, that is good, but you have actually got to get down to the individual data points that are believed to be the problem. You know, there is a case in particular where it's very clear that the individual didn't start working at the HFBR until 1995.

But it hurts that graph because there is no count for 1994, I believe. But, you know, you have got something called an indoctrination sheet that this individual signed. And I talked to the people at Brookhaven. And they say you don't sign that indoctrination -- that indoctrination sheet is basically training. And that allows you to go into the facility unescorted. Months prior to that, I have escorted access logs for the individual.

And this is all stuff that was provided by Brookhaven in their last response

to us. You know, the same situation -- I just today looked at the latest -- the first whole body count, which was done in 1995. And it actually had the notation that said, "This is a new HP transfer to the HFBR." So that is another piece of information that the lack of data in 1994 is really -- it's not that the data is not there. It just was never taken because he wasn't working in that facility. And that is a different example than the first one I gave.

So when I look at all of this stuff, I believe that the dose reconstruction is very feasible for these five individuals. And, like Ron said, this is a small sample, but in my mind, it's a good sample in that the dosimetry information that is there seems complete.

MR. FITZGERALD: Josie, this is Joe. You know, one thing that I think we all agree is that before December 31st, '93, the inconsistency in availability of internal

dosimetry records -- that is how it is phrased in Grady's paper -- was due to an incomplete and inadequate record system at Brookhaven.

And that was, you know, certainly discussed quite a bit. And I think, you know, everybody agrees that the inconsistency, '93 and before, is due to those inadequacies in the record system. And, of course, Brookhaven came around and programmatically made improvements and put them in place in '93. That's why we are talking about '93.

Now, the Work Group asked SC&A to look at beyond the programmatic basis for '93, which was this improvement in the records program. Were those improvements manifest in a better consistency in the records beyond '93? This is not an uncommon question. We have dealt with the same question at other laboratories, like Los Alamos, where the question is, you know, even though it is a programmatic improvement, can you see that improvement manifest in better dosimetry and

better records?

So in this case, we did what we could. And it is difficult at this lab because of the sources, meaning that you don't have a lot of workers -- and Wanda just pointed this out -- that are getting exposed to internal emitters to a degree where you have had a large sample size to deal with.

So we took the sample that we could and looked at that very question, which was the consistency of completeness of records, the same issue.

And what I'm hearing from Grady -- and, you know, I understand what he is saying -- is that, whereas, the inconsistency of December '93 and before was clearly due to the inadequacies of the records program at Brookhaven, the inconsistencies, which seemed to continue after '93, at least through '96, can be explained by details that are now available that point to things such as exposure potential likely being lacking in

maybe orientation of new workers and various other explanations.

But, again, you are dealing with a -- at least on this sample size -- and it's small, but you're dealing with inconsistencies which are comparable to what we would have seen before '93. The difference is that we're hearing explanations that are more traditional explanations as to why you have these gaps.

I guess I am not sure where you go from this. We see comparable inconsistencies. There may be explanations. There is no way to confirm that. I think it's one of these where if we construe that the exposure potential wasn't there and the individual wasn't monitored and, therefore, that's why he doesn't show up with records. You know, that is certainly one tack one can take, and it has been taken at other sites, but it doesn't put the issue necessarily to bed. And I don't know if a larger sample size is even feasible for Brookhaven because of the number of

workers that would, in fact, be given routine bioassays for internal emitters.

But this sample size suggests that the inconsistencies continue. There may be some explanations, but you still see those inconsistencies. So I think that is all we can say at this point from that test that certainly the Work Group had us do.

MEMBER ROESSLER: Joe and Josie, I guess, everybody, this is Gen. To make a conclusion on these graphs makes me very uncomfortable. It just seems because of some of the reasons that Grady has brought up, what might have happened, whether a person maybe didn't have exposure potential and that's the reason they weren't included in a particular evaluation, it seems that that is sort of -- these graphs can really distort the conclusion.

And I think some of the things Wanda said were very persuasive about the situation there at Brookhaven. So I am not

comfortable in extending the period based on these graphs.

To me, the real question I think is can you bound the dose. And I don't know. Grady kind of alluded to that. Maybe he could say a little more based on that.

MR. CALHOUN: Yes. I 100 percent believe we could and without coworker studies even. Based on the data we have on these five individuals and their work histories, the data is complete to do a dose reconstruction. We have multiple whole body counts on people. We have tritium bioassay on people. We know where the individuals worked and when they worked.

One of the five individuals was somebody who was very, very knowledgeable, said they were never exposed to tritium. But there are multiple whole body and urinalysis reports because there were some incidents that they were involved in. So there's a lot of information here now.

And one thing that I agree with Joe on here is that the main driver for the second SEC, the 83.14, is that we started -- like I said earlier, we were finding data that we had captured that they didn't. And they have really done, I won't say a great job, but I'll say a much better job in giving us records. And it is way more information than we typically would have gotten.

So, you know, who knows if that would have even changed the date to be even earlier than '93 if we would have had this kind of information back when we made that 83.14 determination? But they didn't start doing that until 2011, this new records retrieval and storage and response process that they are using.

The main question is yes, I believe that, even without coworker studies, these five individuals, it is certainly feasible to do their dose reconstructions. And we have completed dose reconstructions on all of them.

Some of them were comped based on limited data, some of them non-comped. And then there were people that were comped through the SEC.

CHAIR BEACH: Grady, this is Josie. I've got a question. Did SC&A have access to all of that data that you are just referring to that you just recently got when they pulled the five samples?

MR. CALHOUN: Yes.

CHAIR BEACH: Okay. So you said yes. So Ron was able to use all of that data when he came up with his percentages and --

MR. CALHOUN: Right.

CHAIR BEACH: -- with the five workers? Okay.

MR. CALHOUN: As a matter of fact, I say, you know, neither of us -- after Ted kind of set this up, you know, we both kind of agreed that there was no additional data that either of us were going to pull out to use, but we both had access to the data. And, like I said, I know Ron felt my pain in going

through these hundreds and hundreds, if not thousands, of pages of new documents that we had for these five people.

CHAIR BEACH: This is Josie. And I appreciate the work and diligence it took to do that. I'm sure it wasn't easy. Is that you, Henry, talking or --

MR. FITZGERALD: No, no. Josie --

CHAIR BEACH: Okay.

MR. FITZGERALD: -- I was just going to offer, given what Gen just said, perhaps the way we could go forward on this is, you know, this limited sample size -- given the data we have, there isn't a whole lot more one can do with the data but just to provide some assurance to the Work Group, perhaps, you know, Grady could provide a dose reconstruction. Almost like, you know, we have three or four workers, there could be a bounding dose reconstruction approach for those workers given these gaps that would I think be more specific in terms of answering

some of these issues about how one resolves what may be lingering problems, not so much problems but gaps in the records for these workers.

CHAIR BEACH: That sounds reasonable.

MR. CALHOUN: What you are asking for is with these five individuals, I come up with what would be a somewhat generic dose reconstruction unless you want the actual. But what we would have to do is -- you know, there is at least one of them that was comped based on non-tritium data, you know.

MR. FITZGERALD: My guess is you are probably going to -- you know, during this transition period where, you know, it's not -- it didn't turn on a dime. I think that's what we were saying, that you would have three or four years where it got better, but you are probably going to see gaps and maybe not gaps as large as they were before. But what specifically would you do? Given what seems

to be a wealth of information and data that has come your way from Brookhaven with their new system, does that now give you sufficient information? It sounds like it does, but does that give you sufficient information to do the necessary bridging of those gaps?

MR. CALHOUN: Yes. And, again, I would like to keep it on these five cases. One thing that we can't assume is that these gaps are errors. There is really no reason to believe that no tritium monitoring for '94 and '95 for a guy that had 6 years of tritium monitoring with all zeros is a gap.

MEMBER CLAWSON: Grady, this is Brad. That to me is you're speculating that. And when we start to speculate that, we can speculate into quite a bit of it. We have to deal with the data that we do have.

You know, you can take the other side of it and say there is no reason that they shouldn't have had monitoring. They had it all the way through these years. Why

shouldn't they still have monitoring? And that is part of my issue that I get into this because the 100 millirem per year debate is still going on today. And we see it in the industry all the time. One time we're getting monitored and then the next time we're not because somebody different has made a different determination on it.

So I guess my thing is I need to be able to look at what exactly data that we do have out there. And as to Wanda's comment, one of the things I want to bring up is this has been one of the worst sites that we have ever had for data. And this to me I was thinking with all the individuals we have there, all of the people that were there, I thought this was going to be far, far superior. And here this ends up to be one of the worst ones.

In my eyes, we have got to deal with the facts that we have before us. We can speculate in many cases to what we want. But

to say because these people were all of certain knowledge or anything else like that that they would have known, I really don't think we can do that either because it goes to show if it was, then their data would have been a lot better to it.

Myself, I thought these guys should have been the pearl among all of the processes out here that would have been the best. I really truly believed it was going to be until we got to this point.

MR. CALHOUN: You're right. You're right that this is one of the worst sites that I know of so far. You know, there will be other national labs that are similar. But the fact of the matter is that the 100 millirem per year is, in fact, a requirement. And that is the requirement they have to live to.

But I believe that, you know, the data that we have -- and, like I said, you have got to look at the individual cases. You can't just look at the graph. And I

appreciate the graph, and it is a good illustration, but you have got to look at the individual cases and look at what they did and make a determination because this wasn't a place where, you know, one person stayed in one spot the whole time and should have been monitored and was monitored.

So, you know, like I said, I would be glad to do what Joe suggested and try to throw some hypotheticals out there as far as these five cases because, you know, we didn't continue dose reconstruction. We didn't redo dose reconstruction on people that were comped through the SEC. And we didn't go any further with trying to calculate a tritium dose with individuals who were comped by, you know, using other radionuclides that they were exposed to that were determined through either whole body counts or other types of urinalysis.

MR. FITZGERALD: I guess, Grady, just a little bit more background, the reason

I'm looking at that approach is because before '93, the records lacked credibility to the point where if you had a gap, you would not even attempt perhaps to explain it away because you wouldn't be sure if that gap was just a reflection of the fact that those records went missing.

So there was a point in time, not much --

MR. CALHOUN: Right.

MR. FITZGERALD: -- before what we're talking about here where you couldn't even draw that judgment. Now I think you're saying that based on the record that you're seeing in that time period after '93, when you see a gap, you feel the records database is much more credible. Therefore, you can interpret that gap as maybe being real from the standpoint of either not being monitoring or whatever else.

My concern that I share with Brad is that you get -- unless you have a basis for

determining that that gap was, in fact, a real gap, it still might after '93 be a lack of a record. I mean, there is no way to nail it down unless you do have enough information. And that is what I am saying. If there is, in fact, enough information that is coming over from Brookhaven that wasn't coming over before, that you can substantiate these gaps as being not a gap due to a record being missed but actually a real gap because of lack of monitoring being done, then that is different.

But I don't think I have seen that really provided. I think all we can go by objectively, which is what Ron did, was to highlight the gaps and, you know, without trying to get into a broad analysis of interpreting what that gap means.

So what we have raised to the Work Group is that, you know, certainly the gaps persist. And what you are saying is that there is probably a much better explanation

because you have more information than you had before. And that is kind of what may come to the fore if you are able to provide or use that data to provide the interpretations you are talking about.

Now, if there is simply going to be -- I won't use the word "speculation" but, you know, you were saying hypotheticals. If they happen to be your best guesstimate, rather than something based on the information, then I'm not sure that helps us too much because that is not based on any information from Brookhaven but more health physics judgment as to why somebody didn't have a monitoring record because they weren't monitored, if you follow my logic on that one. So it does have to be grounded I think on the information or the data that we have gotten from Brookhaven and not just simply, you know, a speculation of sorts, professional judgment.

MEMBER ANDERSON: This is Andy. That kind of is my read on it. I am really

looking for all we at this point really know is that things changed in '93 with the program. What we don't know is the gaps after that, you know, how rapidly were the changes implemented so those gaps, in fact, are truly not a need for monitoring. So, you know, a three-year phase-in I'm much more comfortable and accepting things after that it's now fully implemented, actually been in place a while set of criteria, but we really have to look at the data that's -- I really would like to see this -- I hate to say it -- having to do more work, but let's look at how you do it and what the data actually is.

CHAIR BEACH: And this is Josie. I circled and wrote down "hypothetical" also because I think, Grady, we need to know exactly if we do ask you to go back and do more work exactly what we're going to get and if it's going to be useful because I see that we have kind of two paths. One, you know, I believe in a case such as this at BNL, we need

to give the benefit of the judgment to the claimants and set the cut-off date at the end of '96, or if you can do this and give us a chance to look at what you are actually doing, then I would leave that with the Work Group and what your judgment would be.

MR. CALHOUN: Okay. Let me talk a little bit about this, then. And as we all know that the SEC needs to be established because of infeasibility of dose reconstruction. Now, I just want to get into this other case just a little bit and just give you the background and see, you know, what could be a possible outcome here.

You know, we have got an individual who had some positive doses prior to '85, but between '85 and '95, and he retired in '95, he had 10 millirem external total. He had somewhere between 12 and 15 tritium samples taken during that time up to '93. And they were all zero. And he retires in '95. In '94 and '95, there are no tritium samples.

Now, if any of us have ever worked in an HP program, you determine your monitoring. And these individuals weren't done -- or were done -- there was individual -- I will say hazard type evaluations provided. And if you've worked in an HP program, you know that your monitoring program is based on risk. And if an individual had 15 samples, tritium samples, all were negative, almost all of his external dose was negative, I am not going to be able to find a letter that says this individual doesn't need to be monitored in 1994 and 1995 for tritium. Okay. He had whole body counts in '94 and '95. What does that mean? That could mean he was working at BLIP. That could mean he was working in isotope separation and he had more of a fission product thing to deal with than a tritium analysis.

I am just wondering what to do in that thing that is going to be satisfactory in that case to show other than the data that

indicates no dose that he was monitored because right now what we're doing, we're assuming that he should have been monitored. We're assuming that he was monitored. And we're assuming that the records don't exist. And I am not sure that that is a great position. And that is what SC&A is assuming, not NIOSH.

MR. FITZGERALD: Yes, but I would also point out that you're assuming in the other direction that because the record isn't there that there is an exposure-based reason why he wasn't monitored. But, again, I think we're just making a judgment, but we don't have anything to corroborate it.

MR. CALHOUN: I believe they were DOELAP-accredited at that point and had some reasonable programs in place. So it's one of those deals -- and you really can't. It's hard to argue a negative as to why a piece of dosimetry that late in his career with all of the supporting stuff in between is missing.

Now, if he had positive urinalysis up to that point or if he had, you know, a one-year break with positives before and negatives after, I would -- my eyebrows would go up a little bit more and say, "Hmmm. Maybe something here is missing."

But because of the way this one, in particular, came about, it is not a stretch. It is a very reasonable in my thought that those results are inconsequential.

MEMBER ROESSLER: Josie, this is Gen. I want to comment. I feel the same way Brad does, which might be a surprise to Brad, but I think we have to deal with the data that we have. And we could go on with this discussion for a long time, but if I had to vote at this point, I wouldn't know how to vote because I really don't have a good feeling for how a dose reconstruction could be done. How can the dose be bounded? And I think what I need to see is something that has been done by NIOSH before is to present maybe

a hypothetical but sort of a real case that says, "Here is how we are going to go about it."

CHAIR BEACH: Okay.

MEMBER ROESSLER: Rather than just hearing that, "Yes, we can do it," I would like to see how this could be done. I'd like to see an example or two.

CHAIR BEACH: I believe that is exactly what Joe asked for. And I feel --

MR. CALHOUN: I will do that. And, like I said, for the cases that -- you know, one of them I said was comped with something other than tritium, but tritium is the issue. I'll forget that I had that other dose. And I'll show how we would have done tritium for that case.

CHAIR BEACH: Okay. So my question -- this is Josie again. How many cases can you provide for us? One is probably not enough.

MR. CALHOUN: The only reasonable

thing to do is these five cases.

CHAIR BEACH: Okay. Does the Work Group agree with that?

MEMBER CLAWSON: Josie, this is Brad. Yes, I do. I guess there is another part. And I agree with Gen right now, and I am sure that surprises her. But part of the thing is I also want to be able to understand how -- with this information, if we voted that these years weren't there, how are we going to determine which people out there need -- I guess my question is, how are you going to implement this? How would you decide who needed to be monitored or not? I'm still not at a great feeling of how you're going to apply the dose reconstruction for this, how you're going to single out the ones that should be redone or that don't need to be done.

MEMBER ROESSLER: Well, I think that's their challenge. They have to show us.

MEMBER CLAWSON: And this is what

I'm trying to talk about, Gen, is I want to see these cases, but I also want to understand how they are going to implement it to the body of the whole as not just these five cases, but I wanted to find out how they're going to do it to the general public of Brookhaven.

MEMBER MUNN: Well, they had such a low trigger for their assessment program anyway.

MEMBER ANDERSON: So they should have been monitored.

MEMBER MUNN: No. If you are quite assured that your program is not going to produce more than 100 mR of exposure to anybody except 2 or 3 people and those 2 or 3 people aren't showing that trigger either, then, you know, we're talking about doses that are really down in the weeds here.

MEMBER CLAWSON: Okay. And I've got to go to my standpoint on this. I work with sources that are over a million R. Guess what. They determined that under 100 -- I

don't have the potential for under 100 millirem per year.

MEMBER MUNN: Yes.

MEMBER CLAWSON: So when we start saying that, "Well, because they didn't implement this," this all comes down to somebody's interpretation. And over the last seven years of my life, it has been one way and then back the other way, back the other -- and now we're back again to the "No, they don't need to be monitored." Even though we deal with very high sources and possibilities of it, they have deemed, somebody has deemed, that it isn't. And we debate this continuously.

That is a judgment call that somebody makes. That goes back and forth. And for us to just say, "Well, yes. Because they weren't monitored, they didn't even get around 100 millirem," I have personal feelings that, no, that isn't the best defense. I'm not saying that I -- I understand what you're

saying, but I also have to fall back on what I have seen throughout the industry.

And a lot of times, it comes down to the bottom line is money. It costs money to monitor people. And if they can get out of it, they will. And we -- I've seen it, especially the last ten years of my life, back and forth and back and forth, because it all comes down to money.

And I don't think -- and this is just my personal opinion. We can't hang our hat on that 100 millirem. I really don't think that we can.

MEMBER ANDERSON: I am going to have to run.

CHAIR BEACH: Thanks, Henry.

MEMBER ANDERSON: My vote is let's look at some details in the case. I'm not sure I am going to be convinced that we can make that cut at `93, but let's give it another run.

CHAIR BEACH: Okay. Henry, thank

you. We understand.

MEMBER ANDERSON: Sure.

CHAIR BEACH: So at this point, then, does the Work Group agree that NIOSH should go back and look at those five cases and give us how they bounded those cases? Is that what we're looking for?

MEMBER CLAWSON: This is Brad. At this time, yes, I think we have got to look at all of the information from all sides of it. And I think that this would be the best to be able to give us a better feeling of how this is going to be implemented and what they need to be able to do.

CHAIR BEACH: And, of course, NIOSH, can you give us a timeline on that? We are on the schedule for March. And I know that can be changed if need be.

MR. CALHOUN: I don't know. I think it will certainly take, I would say, a few weeks to get all of this together, but I'm not sure.

CHAIR BEACH: So a few weeks mean we won't make a March time frame?

MR. CALHOUN: Well, what date in March is it? I forget.

CHAIR BEACH: The 12th.

MR. CALHOUN: I think that is going to be tough. You know, I mean, after I get off here, I will talk to my bosses and see what they want me to do.

CHAIR BEACH: Okay.

MR. CALHOUN: We'll see what the workload is, but let me just hold off and let you know in the next couple of days. Okay?

CHAIR BEACH: I won't speak for Ted, but I will ask Ted the question, if you can work with Ted, I would assume.

MR. CALHOUN: Sure.

CHAIR BEACH: And, Ted, if you are speaking, you are on mute.

MR. KATZ: No, I am not speaking. I was just --

CHAIR BEACH: Okay.

MR. KATZ: I am not sure what the question was to me, Josie.

CHAIR BEACH: I was just asking if Grady could get with you on the timeline.

MR. KATZ: Whenever. He can send us, the whole Work Group, a timeline.

CHAIR BEACH: Okay.

MR. KATZ: Absolutely.

CHAIR BEACH: And I only suggested that because it is your schedule for March that is going to change.

MR. KATZ: Right. And we can deal with a change, even at the last moment if we need to.

CHAIR BEACH: Okay. Do we need to take an official vote to go this direction? I mean, we heard from Henry, Brad. And I agree that these five cases should be done. Gen, I believe we heard --

MEMBER ROESSLER: Well, or any other supporting information that they can give.

CHAIR BEACH: Okay.

MEMBER ROESSLER: And I think Joe has some good thoughts on how this could be achieved. I think if I were Grady I would talk with Joe a little bit more to kind of get an idea of how to approach this.

CHAIR BEACH: That sounds like sound advice. And, Wanda?

MR. FITZGERALD: That's fine. What we can do is maybe have that discussion and bring something back to the Work Group by email that would be the proposal as far as whatever analysis is called for.

CHAIR BEACH: Does this fall to the level of a technical call or you can just work that out?

MR. FITZGERALD: I would assume we can just work it out.

CHAIR BEACH: Okay. And, Wanda, are you in agreement?

MEMBER MUNN: I don't think we are going to get any more information than we

already have, actually. But that's just a personal feeling. Whatever the Work Group wants to do is clearly going to happen and that if you feel there is additional information that is going to be beneficial, I just can't imagine what it will be.

CHAIR BEACH: Okay. Thank you.

Are there any other comments or questions, or are we ready to adjourn?

DR. BUCHANAN: This is Ron. I just think that we should lay out, you know, what would be achieved so that we just don't have more White Papers going back and forth on the dose reconstruction and how would we present it and what assumptions can be made so that it would, you know, prove something one way or the other, rather than just exchanging White Papers to come up with the same brick wall next time.

CHAIR BEACH: Okay. That sounds like good information. So who would start that? Would SC&A? Would you --

MR. FITZGERALD: I would propose that we have a conference call, technical conference call. I think Ron, myself, Grady. You know, if any Board Member wants to listen in, that's fine, too. But, you know, within the next few business days, just do that.

CHAIR BEACH: Okay.

MR. FITZGERALD: And come up with the best approach that one can, understanding -- and, you know, I have some reservations. I mean, I think we have what we have in the way of data, but I think any way we can help the Work Group sort of understand some of what Grady has said but understand better what the data provides, what this new information that we seem to have more of from Brookhaven, what that can do to facilitate dose reconstruction is about the best we can do at this point.

CHAIR BEACH: Okay. I think that sounds like a reasonable approach. Thank you, Ron, for that advice. Ted, can you -- who would set up the technical call. I would like

to sit in on it.

MR. KATZ: No. That's fine. And I can set it up as soon as I know. Let's give Grady a chance to reconnoiter and figure out what -- he was going to get you some timeline information or whatever and I'm sure Grady as well as Joe and Ron will be thinking about what they want. So just let me know when you're ready to meet, Joe, Grady, and I'll set it up. And we'll do that. And I'll send a notice to the whole Work Group. And anybody who wants to listen in can do that. And we can get it done early next week I guess is what we're talking about.

MR. FITZGERALD: Yes, maybe like Tuesday, sometime by early next week.

MR. CALHOUN: I am, unfortunately, traveling to Los Alamos. I'll be there Tuesday, Wednesday, Thursday. Now I'll look at my flight schedule and see when I can call in if we decide Tuesday is the date. But it is going to be at least a little bit less open

than my typical days here are.

CHAIR BEACH: Okay. And we can --

MR. KATZ: Let me ask this question just before we -- how much time do you guys need to think about this because we could do it tomorrow if you wanted to?

MR. FITZGERALD: I would like to have at least a day.

MR. CALHOUN: Yes, yes.

MR. KATZ: Okay. That's fine. I mean, Monday is Presidents Day. Grady, you're traveling starting on Tuesday?

MR. CALHOUN: Yes. I'm traveling Tuesday. I've got a meeting there Wednesday. And I'm coming home Thursday.

MR. KATZ: So is there a time of day on Tuesday that would work for you?

MR. CALHOUN: Well, I can look at my flight here. Let's see. Hold on.

MR. KATZ: Sure.

MEMBER CLAWSON: Hey, Josie, this is Brad. I've got a nuclear fuel element that

has my name on it, and they're waiting for me to go. So I'm going to sign off, but if we could just be apprised, the Work Group, of what is kind of pushing forward, I would greatly appreciate it.

CHAIR BEACH: Of course, Brad. Thank you.

MEMBER CLAWSON: Bye bye.

MR. KATZ: Bye, Brad.

MR. CALHOUN: Well, we either have to do it probably before 8:00 a.m. on Tuesday, which is unlikely --

MR. KATZ: Yes.

MR. CALHOUN: -- or my flight arrives at 2:00. And then I've got to drive to Santa Fe. So that's at least an hour. So 3:00. So that would probably push me to I guess 4:00-ish on Tuesday.

MR. KATZ: Okay. But 4:00-ish there, that's 6:00 p.m. Eastern time?

MR. CALHOUN: Yes. There you go. Sorry. I didn't think of that. Okay. And

then the other option is I have to find the times of my meetings. I've got my meeting -- that's not -- the meeting date on Wednesday.

MR. KATZ: Yes. I think Thursday is a Work Group meeting. So it would have to be Wednesday. And Josie is traveling part of the day on Wednesday.

CHAIR BEACH: I don't necessarily have to sit in.

MR. KATZ: Okay.

CHAIR BEACH: I will try to make whatever is most convenient for Grady and Joe.

MR. KATZ: Okay. Well, Grady, I don't mean to put you on the spot while you are on the phone, but if you can shoot for a time on Wednesday that works that is reasonable --

MR. CALHOUN: Yes. My meetings are 9:30 a.m. and 4:30 p.m. on Wednesday, it looks like.

MR. KATZ: Is there a big gap in between there?

MR. CALHOUN: So I guess maybe -- it depends on how far I am from -- I don't know. I'm going to have to check out and see how far I am from the meeting center, too, see how much driving I've got to do.

MR. KATZ: So you think there is somewhere in the middle of the day that might work?

MR. CALHOUN: I think that would probably be the best, it looks like. I can't imagine them lasting more than a couple of hours, you know.

MR. KATZ: Okay.

MR. CALHOUN: So it would probably be noonish, whatever time that is. So that would be 2:00-ish, I guess, your time.

MR. KATZ: And that would work. We have a Rocky Flats Work Group meeting at 10:00, but that will be done by then. Folks pencil that in. Let's just pencil in 2:00 o'clock on Wednesday. Grady can let us know if that won't work. But let's help keep an

eye to that, everybody, on your calendars.

CHAIR BEACH: All right. Then you might look at Friday also. We do have an SEC call at 8:00 o'clock but maybe in and around that.

MR. KATZ: No. We have it at 11:00 o'clock, Josie.

CHAIR BEACH: Oh, 8:00 o'clock my time. Sorry.

MR. KATZ: Yes. Sorry.

CHAIR BEACH: I write in my time so I don't lose it.

MR. KATZ: Right. Yes. We need to get Grady if he's going to have a discussion he needs to have it early enough that he can get things done.

CHAIR BEACH: Yes.

MR. KATZ: But Friday, right, would be the only other possibility that week. Okay. So, anyway, we will wait until we hear from Grady about time. And in the meanwhile, Ron and Joe and Grady can think about what

they might do.

CHAIR BEACH: That sounds great. So, if there is nothing else, I can say we can adjourn this meeting. And thank you, everyone, for your attendance and comments.

(Whereupon, the foregoing matter was concluded at 4:15 p.m.)