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UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

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INCIDENT INVESTIGATION TEAM

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INTERVIEW OF MITCHELL S. GALANEK

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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THURSDAY, OCTOBER 19, 1995

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INTERVIEWERS:

SAMI SHERBINI

ALAN MADISON

THOMAS O'CONNELL

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

(3:38 p.m.)

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MR. SHERBINI: Okay, it's October 19th, about 3:40, the second interview with Mitch. My name is Sami Sherbini. We'll just introduce the people present.

MR. GALANEK: Mitch Galanek.

MR. MADISON: Alan Madison

MR. O'CONNELL: Tom O'Connell.

MR. SHERBINI: Since we've gone over the formalities before, we won't go --

MR. MADISON: Sure. We can treat this as a continuation.

MR. SHERBINI: Yeah, it's a continuation thing. And the purpose of this interview, which should be very short, is to just bring up a few points that came up since our last talk about the whole body counting data.

MR. GALANEK: Okay.

MR. SHERBINI: One of the things that wasn't clear was we were given two numbers for the calibration of the spectrum scale. One was 1KV per channel and one was 10. Which is it?

MR. GALANEK: It's one.

MR. SHERBINI: 1KV per channel?

MR. GALANEK: Correct.

MR. SHERBINI: The phantom -- what's the

1 material to which it's made? It looks like some kind of
2 boards -- paper boards?

3 MR. GALANEK: Similar to a methyl methacrylate
4 or a plexiglass.

5 MR. SHERBINI: It is?

6 MR. GALANEK: Right.

7 MR. SHERBINI: Okay. The phantom without the
8 sources gives higher background than what the sources --
9 than without anything in the chair.

10 MR. GALANEK: Correct.

11 MR. SHERBINI: What's the -- do you know what
12 the --

13 MR. GALANEK: I believe it's just --

14 MR. SHERBINI: Just activity?

15 MR. SHERBINI: -- activity, natural activity in
16 the material itself, the same as a human being sitting
17 there and increasing the background.

18 MR. SHERBINI: Okay. Yeah, one of the
19 problem -- one of the questions that came up was the
20 fraction of the body that is viewed by the -- and the
21 number given to us was 65%. How is that number arrived at?

22 MR. GALANEK: That was from a paper by Frank
23 Masse and Murray Bolton printed in Health Physics I think
24 in 1968 or '70, and I can provide you a copy of that paper.

25 MR. SHERBINI: Yeah, that would be useful. Is

1 that paper -- was that paper done on that counter?

2 MR. GALANEK: Correct.

3 MR. SHERBINI: And that was to determine the
4 angle of the --

5 MR. GALANEK: Correct.

6 MR. SHERBINI: Okay. Would that apply to
7 anybody or most people or does it change?

8 MR. GALANEK: I haven't had enough whole body
9 counting experience with a bone seeker to know the answer
10 to that.

11 MR. SHERBINI: Okay.

12 MR. GALANEK: You probably should ask Frank
13 Masse. He's counted a lot of people.

14 MR. SHERBINI: Okay.

15 MR. GALANEK: And designed the chair.

16 MR. SHERBINI: Okay. Is he comfortable with
17 the 65%? He approved it?

18 MR. GALANEK: Correct.

19 MR. SHERBINI: Okay. The other question, I
20 guess, is an estimate of what they think the accuracy of
21 this -- of the whole body counter result is. Do you have
22 any feel for what kind of accuracy you're getting based on
23 the way you're calibrating the system and the 65% number?
24 Was there any assessment of accuracy?

25 MR. GALANEK: I've not done that, but I could

1 do that for you.

2 MR. SHERBINI: No, not necessary. I'm just
3 asking.

4 MR. GALANEK: I would say plus or minus 15%.

5 MR. SHERBINI: 15? Okay. In the final intake
6 number?

7 MR. GALANEK: No, no, no, that would be in --

8 MR. SHERBINI: In each reading?

9 MR. GALANEK: Right.

10 MR. SHERBINI: Okay, so each microcurie reading
11 from a count would be within plus or minus 15%?

12 MR. GALANEK: I believe that. I think that
13 paper discussed it, and I would just have to look at some
14 of the numbers again. I've not done that assessment.

15 MR. SHERBINI: Okay. So maybe after the
16 interview if we can get a copy of that paper?

17 MR. GALANEK: Sure.

18 MR. SHERBINI: That should answer a lot of
19 these questions. Does the background change with time?
20 You use the same background for a series of counts, right?
21 Is there any data to show that it's pretty much constant,
22 or does it change much?

23 MR. GALANEK: Unfortunately, through this
24 series of counts, we did not take a daily background. We
25 took a daily count of the phantom --

1 MR. SHERBINI: Of the sources?

2 MR. GALANEK: Correct. And we took a daily
3 count of Dr. Li. What I could do is, if it's acceptable,
4 take a daily background of a subject, ie. myself or someone
5 similar to Dr. Li's size for the next 30 days. I don't
6 believe there is much fluctuation in the background. I
7 counted several people from the industrial hygiene office,
8 and I think maybe one was 6,500 total counts. One was
9 6,200 something, and one was 6,400.

10 I believe I was 6,500. I'm a little heavier
11 than -- so I would say it's within plus or minus one to two
12 standard deviations of the count.

13 MR. SHERBINI: Okay, so you say the range that
14 you saw in your people was about what?

15 MR. GALANEK: I think somewhere -- one of the
16 fellows is a marathoner. He weighs 128 pounds soaking wet,
17 and I think he was 5,900 -- between 5,900 and 6,000.

18 MR. SHERBINI: Okay.

19 MR. GALANEK: I believe my count was closer --
20 around 6,500.

21 MR. SHERBINI: Okay.

22 MR. GALANEK: Someone who resembled Dr. Li was
23 about at 6,300. 6,300 to 6,400.

24 MR. SHERBINI: Okay. And if I recall, there
25 were -- during this series of counts on Dr. Li, there were

1 two background measurement, is that correct? One was done
2 initially after -- or close to the first count, and one was
3 done, I think --

4 MR. GALANEK: I'd just have to look at the data
5 and --

6 MR. SHERBINI: Okay, okay. Maybe you can check
7 that for us, please?

8 MR. GALANEK: Sure, sure.

9 MR. SHERBINI: Thanks, Mitch. Okay, this is
10 the last thing really that I have. The calibration of the
11 system -- do you do efficiency in calibrations or --

12 MR. GALANEK: Not routinely for P-32 because
13 it's not something that -- we have done routine energy and
14 efficiency calibrations on the system. It's due to be
15 done. I don't think it's been done in approximately a year
16 or longer. It was done in '94.

17 MR. SHERBINI: -- frequency kind of thing?

18 MR. GALANEK: Excuse me?

19 MR. SHERBINI: Is that an annual frequency or
20 is it as needed?

21 MR. GALANEK: I don't know that it's been done
22 every year.

23 MR. SHERBINI: Okay. Okay, I don't have any
24 more questions at this time. We'll probably need to
25 discuss the liquid scintillation counting data.

1 MR. GALANEK: Sure.

2 MR. SHERBINI: Would you be the person to --

3 MR. GALANEK: Correct.

4 MR. SHERBINI: Okay, okay. So maybe we'll set
5 up another meeting --

6 MR. MADISON: After you've had a chance to
7 review that.

8 MR. SHERBINI: Yeah, maybe tomorrow or next
9 week.

10 MR. MADISON: I've got a couple of questions.
11 Who designed the phantom?

12 MR. GALANEK: I believe Frank Masse and Murray
13 Bolton.

14 MR. MADISON: Okay. Do you happen to know what
15 the basis for the design was?

16 MR. GALANEK: No, I think it -- if you ask
17 Frank, you would get -- I could only speculate.

18 MR. MADISON: I understand. You're going to
19 have to help me out here too. I missed the first
20 interview, and I haven't had a chance to review your --

21 MR. GALANEK: Sure.

22 MR. MADISON: -- transcript. What is your
23 background?

24 MR. GALANEK: My degree is in biology, and I've
25 been employed at MIT in radiation safety for the past 20

1 years, and I'm a certified health physicist. That's it.

2 MR. MADISON: All right, I guess you just want
3 to recap the documents you requested?

4 MR. SHERBINI: Yes, the paper and the check on
5 the -- how many background counts were made during the --
6 Dr. Li's series of counts. That's about it. These are the
7 two things.

8 MR. MADISON: Are there records that go along
9 with the calibration of the chair as you were talking
10 about earlier?

11 MR. SHERBINI: There should be, yeah. Okay.

12 MR. MADISON: Would you want to have copies of
13 those?

14 MR. SHERBINI: Yeah, might as well. The last
15 calibration that was done.

16 MR. GALANEK: Okay.

17 MR. SHERBINI: I think Tom has questions.

18 MR. O'CONNELL: Yeah, I have a couple of
19 questions. Prior to the use of the whole body counter,
20 what type of QC checks were run?

21 MR. GALANEK: We would energy calibrate with a
22 cesium-137 check source to see that it's in channel 662.
23 And we may or may not take a background count.

24 MR. O'CONNELL: Would that check with the
25 cesium source be done prior to use -- or was it done prior

1 to use in this particular series of counts with Dr. Li?

2 MR. GALANEK: I don't believe it was, no.

3 MR. O'CONNELL: Okay. When we took a look at
4 the phantom, we noticed there were a number of
5 compartments --

6 MR. GALANEK: Right.

7 MR. O'CONNELL: -- associated with the design.
8 Would you know if that design approximate -- like a
9 skeletal distribution, or is that based on --

10 MR. GALANEK: -- the compartments. There's a
11 GI tract, there's two kidneys, a liver, two lungs and two
12 thighs. So again, I think Frank might be able to better
13 help you with the design of that phantom since he's the one
14 who was involved in the design.

15 MR. O'CONNELL: Okay. I was just wondering
16 whether or not that was taken into account when you made
17 your calculations for the estimate of the intake.

18 MR. SHERBINI: The design or the distribution,
19 you mean?

20 MR. O'CONNELL: Yes, correct, the distribution
21 of the --

22 MR. GALANEK: No, it wasn't. The only factors
23 that have been used in the calculation are the 65% field of
24 view and a calibration factor based on how much activity we
25 placed in the phantom to begin with against that known

1 activity or the count we got on the multi-channel analyzer.

2 MR. O'CONNELL: Was the -- this is my final
3 question. The final number that was estimated for the
4 amount of microcuries of P-32 ingested, was that based on
5 using the whole body count analysis, --

6 MR. GALANEK: Based on three --

7 MR. O'CONNELL: -- using the liquid
8 scintillation, or some combination of --

9 MR. GALANEK: It was based on three. It was
10 based on urine concentration, incremental urine activity,
11 and whole body counting.

12 MR. O'CONNELL: Okay. Could we take a look at
13 whole body counting correlated somehow to the liquid
14 scintillation results?

15 MR. GALANEK: I don't know where that -- I
16 don't know what you're asking.

17 MR. O'CONNELL: Well, I'm just -- the final
18 quantity of intake of P-32, --

19 MR. GALANEK: Right.

20 MR. O'CONNELL: -- is not based on one or the
21 other. It's not based on the whole body count analysis?

22 MR. GALANEK: The whole body count analysis --

23 MR. O'CONNELL: Liquid scintillation.

24 MR. GALANEK: -- I believe gave us -- as I
25 recall, and -- just request the reports because we have

1 them. But the whole body gave us the highest number. The
2 iterative weighted fit of incremental urine gave us the
3 second highest number. And the urine concentration values
4 gave us the lowest number.

5 And that range is somewhere between 500 and
6 that maximum 579 microcuries.

7 MR. SHERBINI: Would you say that again, Mitch?
8 I'm sorry, I missed that part.

9 MR. GALANEK: The intake that was calculated
10 was calculated for three -- and different analyses. The
11 whole body count, which was the highest; the incremental
12 urine, which was the next highest; and the urinary
13 concentration, which was the lowest.

14 MR. SHERBINI: I guess I'm not sure I
15 understand the distinction between the incremental urine
16 and the urine concentration. What are these?

17 MR. GALANEK: The computer program INDOS allows
18 you several ways to calculate an intake.

19 MR. SHERBINI: Okay.

20 MR. GALANEK: And one is by taking total
21 activity for 24 hours, and that's the incremental urine.

22 MR. SHERBINI: Ah, okay.

23 MR. GALANEK: The other is when you have spot
24 samples as during our meeting yesterday over the first few
25 days where we have urine concentrations, it also allows you

1 to do that. So --

2 MR. SHERBINI: Okay, and the difference --

3 MR. GALANEK: -- we have used the three
4 different methods to try to arrive at the intake. And if
5 everything we've done is correct, then we have the correct
6 number. If we have made some big gaff, I would have
7 thought it would have -- the numbers then would be all over
8 the map.

9 MR. SHERBINI: Yeah, yeah.

10 MR. GALANEK: When you have values of -- I
11 think they're 512, 554, and 579, --

12 MR. SHERBINI: Which one is which, Mitch?

13 MR. GALANEK: I believe 512 is urinary
14 concentration.

15 MR. SHERBINI: Okay.

16 MR. GALANEK: I think it's 554 or so is the
17 incremental urine, and 579 was the whole body. They just
18 seem to all come together.

19 MR. SHERBINI: Yeah. Okay, I guess the
20 difference between the two urine things is the volume,
21 right -- the program assumes 4,800 for the 24 hour --

22 MR. GALANEK: That's my -- I am not an expert
23 at the INDOS.

24 MR. SHERBINI: I've never used INDOS. Who --

25 MR. GALANEK: It's Skrable Enterprises who

1 produces it. The person that was --

2 MR. SHERBINI: Who uses it on your staff?

3 MR. GALANEK: Bill Irwin.

4 MR. SHERBINI: Okay, maybe we can talk with
5 Bill.

6 MR. GALANEK: Sure. No, in fact, he's
7 anticipating that.

8 MR. SHERBINI: Okay, great. Okay, okay. Any
9 more questions?

10 MR. MADISON: The reports you mentioned, Mitch,
11 have we not requested those reports?

12 MR. SHERBINI: Which reports?

13 MR. MADISON: That we just discussed. He said
14 just ask for the reports and it should lead you to the same
15 answers he has. We need to request those reports on how he
16 -- I am now requesting those reports.

17 MR. GALANEK: Okay.

18 (Laughter.)

19 MR. MADISON: Okay.

20 MR. SHERBINI: Are these the official reports
21 that you sent to Dr. Li or is that different --

22 MR. GALANEK: We sent Dr. Li a summary of what
23 was done, including those reports. Dr. Li had the same
24 access to INDOS through the outside consultant looking at
25 our program. So there can be three sets of reports. Dr.

1 Li has a set of reports, the consultant has provided us
2 with a set of reports.

3 However, some things he was putting in the
4 mail, so that's not complete yet. And we have a set of
5 reports.

6 MR. SHERBINI: Okay.

7 MR. GALANEK: All based --

8 MR. SHERBINI: The summary that you sent Dr.
9 Li, are your reports with it, or --

10 MR. GALANEK: No, it had a summary with the
11 estimated intakes and a graphical representation of how
12 it -- what the data -- where the data fell against the
13 predicted --

14 MR. MADISON: My understanding of what I'm
15 requesting is the base documents you use to do that summary
16 report.

17 MR. GALANEK: Correct, correct.

18 MR. MADISON: And that's what we want.

19 MR. GALANEK: Right.

20 MR. SHERBINI: Okay, any more questions?

21 MR. O'CONNELL: I'm all set, thank you.

22 MR. MADISON: I have one more question. Is
23 there anything else that we should have asked for that we
24 haven't asked?

25 MR. GALANEK: The Geiger-Mueller readings of

1 Dr. Li. That just hasn't been a part of --

2 MR. SHERBINI: Okay, I think we had requested
3 that, or wasn't it on the list?

4 MR. GALANEK: I don't think it was in the list.

5 MR. SHERBINI: Okay.

6 MR. GALANEK: So you want that?

7 MR. MADISON: We want to request that.

8 MR. GALANEK: Because Dr. Li has a copy of
9 everything we've done throughout this. That can be maybe
10 confusing, because I've seen the bibliography now from
11 Cherie that lists everything he gave you, and anything that
12 has to do with analyses is a copy from me.

13 MR. MADISON: Sure.

14 MR. GALANEK: So we are --

15 MR. MADISON: We can -- one of the methods we
16 can use is to request it during the interview, --

17 MR. GALANEK: Oh, okay.

18 MR. MADISON: -- and then we'll follow up with
19 it with Cherie.

20 MR. GALANEK: All right.

21 MR. MADISON: But that's why I want to go ahead
22 and request -- recap on the documents again so it's --

23 MR. SHERBINI: The reports?

24 MR. MADISON: Right.

25 MR. GALANEK: You want to INDOS reports?

1 MR. SHERBINI: The base report, yeah.

2 MR. MADISON: The baseline reports.

3 MR. SHERBINI: The GM survey, whole body
4 survey, the initial survey of Dr. Li.

5 MR. GALANEK: Okay.

6 MR. MADISON: You've requested the paper?

7 MR. SHERBINI: The paper? Correct.

8 MR. GALANEK: Right.

9 MR. SHERBINI: And the check on how many whole
10 body counts were made during the --

11 MR. MADISON: Background.

12 MR. SHERBINI: -- background checks.

13 MR. MADISON: And the calibration records of
14 the chair.

15 MR. SHERBINI: And the calibration records,
16 yeah. Okay, I think that's -- okay, then the interview is
17 ended at 3:55.

18 (Whereupon, the proceedings were adjourned at
19 3:57 p.m.)

20

C E R T I F I C A T E

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: INTERVIEW WITH MITCHELL S. GALANEK

Docket Number: --

Place of Proceeding: Cambridge, Massachusetts

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

K. Wood
Official Reporter
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