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ADDENDUM/ERRATA SHEET

Page	Line	Correction and Reason for Correction
Throughout	various	"Dr" Masse' should read "Mr"
4	18	"Lynmarac" should be spelled LINAC
7	1	"They" refers to the results of urine samples
9	10, 11	"air bags" should be air-borne body burdens
9	15	"established" should be worked with
9	24	"match" should be measure
10	25	"Marty" should read Murray (Bulton)
11	22	you don't count the whole body
12	22	"work --" should be work harder
13	12	"matter" should read man
13	18	"--" should be measure
14	16	"Per+" should be plot that we sent --
17	1	"--" should be bare
19	22	"Wednesdays" should be Wednesday (8/16)
20	10	"on" should read not
21	18	-- should read words
22	12	"notes" should read noise
28	17	"Carrier" should read Curator
35	7	"before" should read after
36	8	They're all in common use and --
40	20	"Techniques" should read Techniques
45	4	"on the base" should read in the base --
48	13	-- should read be applied.
48	23	-- should read personnel

10-95-S9A continued

ADDENDUM/ERRATA SHEET

Page	Line	Correction and Reason for Correction
53	5	"but we don't feel -- don't want to be there"
54	3	"his" should be ours
54	7	Mace is speaking here.
56	21	Mace is the speaker here also

Page 2

Date 11/13/95

Signature FX Mace

ADDENDUM/ERRATA SHEET

Page	Line	Correction and Reason for Correction
54	7	The identity of "GLENN" is wrong. The speaker is clearly "Masse."
56	21	"You" should be "I" - to make sense in context. likewise "me" should be "you"

Page 1 Date 10/27/45 Signature John E. Allen

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UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

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INTERVIEW OF FRANK MASSE

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FRIDAY, OCTOBER 20, 1995

- - - - -

2:03 O'CLOCK P.M.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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INTERVIEWERS:

JOHN GLENN

Chief Interviewer

Team Leader

GREGGORY P. GONECONTO

THOMAS F. O'CONNELL

SAMI SHERBINI

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

2 (2:03 p.m.)

3 MR. GLENN: The date is October 20, 1995. The
4 time is about three minutes after 2:00. This is an
5 interview by the Incident Investigation Team at MIT,
6 looking at a P-32 incident that occurred in August of 1995.

7 This will be an interview of Frank Masse, who
8 is the Radiation Safety Officer.

9 My name is John Glenn. I am the leader of the
10 IIT. And I will now ask the other people with the NRC to
11 identify themselves.

12 MR. GONECONTO: My name is Gregory P.
13 Goneconto, and I'm a Special Agent with the NRC Office of
14 the Inspector General.

15 MR. SHERBINI: Sami Sherbini, Health Physicist
16 in Washington.

17 MR. O'CONNELL: Thomas O'Connell, Massachusetts
18 Department of Public Health, Radiation Control Program.

19 MR. GLENN: You were present at the entrance
20 interview the other day, so a lot of what I was going to
21 say you've already heard. The purpose of the IIT is to
22 establish what happened, probable cause, and to develop
23 lessons learned, so that we can pass them on to the
24 industry, and, in fact, determine whether we need to do
25 anything with our own regulations.

1 I don't think Gregg was here on Tuesday. He is
2 not a member of the team but is an observer.

3 The reason we're having this is to obtain
4 information from those people who were directly involved.
5 I believe that you were involved in some of the early
6 decisions about the bioassays, and so forth.

7 We are transcribing it. This is to aid us in
8 developing the record, and it also helps us so we don't
9 have to be writing notes and asking questions at the same
10 time. It makes things a little bit easier for us.

11 The transcripts will be available for review,
12 and I guess this transcript would be available tomorrow, if
13 you wanted to come in and review it, or Monday, you know,
14 any time we're here you can come review it. You can
15 essentially fill out an errata sheet. You can't actually
16 excise the transcript.

17 The transcript is what the transcript is, but
18 you can note this word was -- that isn't the word that I
19 used. This is the word I meant or this is the word I said,
20 and you can say that since then I've remembered this, and
21 you can correct the record, and that sort of thing. And
22 then both documents become the record.

23 At the conclusion of the IIT, after we publish
24 the final report, the transcripts will be available. You
25 can request your own transcript, and we let everybody know

1 in advance that it will probably be in the PDR and
2 recoverable, you know, under Freedom of Information
3 request, so that the whole world, in fact, can view what we
4 do here today.

5 Okay. Frank, I wonder if we just, for the
6 record -- go off the record for just a second.

7 (Whereupon, the proceedings were off the record
8 briefly.)

9 MR. GLENN: We went off the record. We're
10 resuming the interview. It's now about eight minutes after
11 2:00.

12 I was just, I thin,k getting ready to ask you,
13 Frank, to officially state your name for the record and
14 describe what you do at MIT, your official functions.

15 DR. MASSE: Okay. Frank Masse is my name, and
16 I serve several roles, but primarily I'm the Director of
17 MIT's radiation protection programs. I serve also as the
18 Institute Radiation Safety Officer and the Bates-Lynnac
19 Radiation Safety Officer.

20 MR. GLENN: Do you want to tell us a little bit
21 about your background, in terms of positions you may have
22 held in society?

23 DR. MASSE: Right. I've been here for 37
24 years. I've been in the field for 42 years. I have -- I
25 also serve as the Radiation Safety Officer of other

1 institutions in the area, both academic and medical. I am
2 certified in both health physics and medical physics. I
3 have -- I am a past president of the Health Physics Society
4 and have held, you know, numerous positions in the Health
5 Physics Society.

6 I currently am on the Executive Committee of
7 the International Radiation Protection Association, and I
8 am also on the Executive Committee of the American Academy
9 of Health Physics, and I am currently the Chairman of the
10 Council of Scientific Society Presidents, which is a
11 society of 65 society presidents representing 1.6 million
12 scientists.

13 Other than that, I am at your --

14 (Laughter.)

15 MR. GLENN: I guess the -- you already gave us
16 a rundown of the sequence of events during the entrance
17 interviews. I'm not going to ask you to go through a
18 narrative of the events. We essentially have that on the
19 record already.

20 DR. MASSE: Good.

21 MR. GLENN: And so, instead, I'd like to
22 explore just some specific areas that we're looking at.
23 The first one is in terms of the assay of the uptake of the
24 investigator. What was your involvement in that? What do
25 you know about how the assessment was done?

1 DR. MASSE: Okay. The first -- the first very
2 crude assay, of course, was done over the phone Saturday
3 night. And I just ran the numbers in my head, in terms of
4 the body water content of that stage in the game. It was a
5 very crude estimate, because we had no idea at that stage
6 when the intake had occurred. But we could come up with a
7 pretty reasonable -- Mitch and I over the phone --
8 estimate, just knowing what the body water content of the
9 average man is and knowing what the concentrations were.

10 As I recall our conversation that evening, I
11 said we're in the hundreds of microcurie range, but, you
12 know, not huge, but certainly more than a hundred maybe,
13 and as much as 300 microcuries was my initial -- my initial
14 reaction. And I also indicated, as I recall, that, you
15 know, assuming that it had occurred within the week, the
16 intake was probably no more than double the number that he
17 currently had aboard.

18 And so we -- you know, we basically were
19 starting from there, so -- and I -- you know, I have a dog-
20 eared Part 20 beside my bed, and I came to a quick
21 conclusion that this was not a 24-hour incident, but, if
22 anything, we may be looking at eventually a 30-day
23 reporting requirement.

24 Then Monday, of course, we got into rigorous
25 dosimetry. As I indicated the other day, we had a lot of

1 difficulty initially with the urine samples, because they
2 were all over the map, and the problem was that Yuging was
3 forcing fluids and excreting huge quantities that we were
4 unaware of, because we were only getting grab samples at
5 that stage in the game. And so that's when we started
6 going to the 24-hour samples, to get better data.

7 The best data that we had I think from day one
8 was the whole body count data. And we needed to improve on
9 the calibration, it having been many years since I thought
10 about calibrating for a pure beta emitter. But it comes
11 back, you know, the old memory works. And we were able to
12 get back to that calibration, eventually, to help to
13 reinforce everything.

14 In terms of the numbers that you were getting,
15 how quickly do things settle into, you know, a curve that
16 you could follow of the assay didn't change very much. It
17 probably was a week before we began to feel some comfort
18 with the numbers.

19 In the early days, we didn't get to INDOS until
20 probably toward the end of the first month. In the early
21 days, we were using -- first, just ICRP-30, and then we
22 went to the NUREG, and the NUREG, which NRC published, does
23 have really good guidance.

24 I have to say, though, that it's a little
25 misleading because it sort of indicates that you can use

1 sort of any single day's data and come up with a number and
2 project it back to an intake. And if you do that, you're
3 going to low ball it. We were -- we were thinking in the
4 three to four hundred range, while we were approaching it
5 from that direction.

6 It wasn't until we decided, you know, we've got
7 superb data at this stage in the game with -- with two
8 months' worth of 24-hour urine samples and two months'
9 worth of daily whole body counts, I think we probably had
10 proven the model, in fact, so -- but not until you get to a
11 good iterative fit do you really realize where you are, and
12 it brings the number up.

13 MR. GLENN: Yeah.

14 DR. MASSE: But it's -- I think we've got the
15 best number that we can arrive at at this stage in the
16 game.

17 MR. GLENN: In terms of the -- you were doing
18 both urinalysis and whole body. Do those two methods
19 agree, or how closely do they agree?

20 DR. MASSE: They do now. We had some
21 discrepancies early on, and it wasn't until Mitch and I sat
22 down and really poured through it in some detail that --
23 that we were able to recognize where the discrepancies
24 were. Our whole body counter was developed by me back in
25 the '60s, and I had the advantage of having Robley Evans

1 here with an operating program still with the iron room.
2 And, you know, Rob and I played games all the time on, oh,
3 boy, I've got one, let's see what you can find, sort of
4 thing.

5 I mean, it couldn't have been healthier, you
6 know, because we were able to intercompare measurements
7 with all kinds of radionuclides. And on his dial painters,
8 as well as our -- we had the cyclotron working then, and we
9 built the system for the cyclotron people. They had huge
10 variations of radionuclides working at the cyclotron air
11 bays in zinc 65 and with the work that they were doing
12 irradiating uranium compounds for filling out the Segre
13 charts with the two-second half-life stuff that Coryell did
14 back in those days.

15 They had established curies of activity. And
16 so we had wide burdens that were significant. We were
17 using Robley's iron room for those measurements for health
18 physics purposes for years, and he was upset because,
19 number one, we were using a lot of his research time. But,
20 number two, he was afraid we were going to contaminate the
21 thing, and so we built the chair primarily as a screening
22 device but found after a while, and after playing with it
23 for a while, that indeed it was a good absolute detector
24 and we could match what's within it any time.

25 And so for years any time either of us had a

1 good absolute positive number, we would intercompare them,
2 and so we have the best that's possible cross-contamination
3 and cross-calibration that anybody could have.

4 We did not appreciate in the early days the
5 ability that we had for pure beta emitters, until Evans
6 sent me a strontium dial painter. He had a bunch of
7 strontium dial painters he was working with. He said, "All
8 right. Let's see how good you are."

9 (Laughter.)

10 So we calibrated using -- at that time, we were
11 using five-gallon polyethylene jerry jugs as phantoms.
12 We'd fill one with water or with solution of activity in it
13 and lay it on the seat and put the other one filled with
14 water, with the activity in that, up in back to simulate
15 the body. And we just used P-32 to simulate the
16 strontium 90-yttrium 90 daughter, and calibrated with that,
17 and then said, "Okay. Send your radium dial or your
18 strontium dial painter over, and we'll see how we can do."

19 And we hit it right on the nose, and we -- and
20 the nice part of it was that this strontium dial painter
21 was traveling around the world to all of the whole body
22 counters to sort of intercalibrate the whole body counter,
23 so we were in that loop, and so we clearly established our
24 ability to do it and to get a good number.

25 Marty had -- or, rather, Mitch had not played

1 with any of that stuff in recent years, but it comes back,
2 and we were able to put it back into place here. And the
3 other thing that Mitch was not aware of -- all of his
4 calibration -- the calibrations that he has been using
5 routinely, we don't have that much whole body counting left
6 to do.

7 We've got the reactor, we've got Bates, and
8 there aren't many people that are handling that much
9 activity -- gamma emitters -- anymore, that we need that
10 much whole body counting. But the whole body counting that
11 has been done routinely in the lab in recent years has been
12 based on Canberra's calibration.

13 That chair was marketed for a number of years
14 through Canberra, and I helped Frasier Bronson and Canberra
15 get the calibration going, and essentially turned the
16 calibration program over to him, and they write the
17 software for the calibration for the system now. They had
18 it -- they marketed that unit for probably 15 years, and so
19 that's where the calibration comes from.

20 But Mitch was not aware of the 65 percent
21 figure, for example, where you're not counting. With a
22 chair like that, you don't whole body, and we had
23 established the 65 percent fraction through Evans and
24 through Los Alamos when they -- back in the '60s, Los
25 Alamos had a round robin system going where they would --

1 they were feeding people things like cesium 137 and sending
2 them around the country to get counted in the various whole
3 body counters as a calibration for them.

4 (Laughter.)

5 We don't do that anymore.

6 (Laughter.)

7 You remember those days.

8 (Laughter.)

9 So that's where the 65 percent came from on a
10 standard man, you know.

11 MR. GLENN: And you did find that, you know, in
12 the case of strontium 90, that using the P-32 within this
13 jug kind of phantom --

14 DR. MASSE: It worked, yes.

15 MR. GLENN: But even though it's a bone seeker,
16 you got good results.

17 DR. MASSE: We got good results. We got
18 excellent results, yeah. And when we converted -- the
19 problem with water jugs is when we were commercially
20 distributing the chairs through Canberra we had a few
21 incidents of water jugs. The polyethylene water jugs will
22 work -- in time, and we had a few cases of the five gallon
23 water jugs full of radioactive material splitting in the
24 chair, and so we decided we'd better go to a solid phantom
25 and that's when we went to the masonite that we've been

1 using. And we cross-checked the masonite against the
2 polyethylene and worked it through that way, of course,
3 when we got the masonite.

4 MR. SHERBINI: So that material is masonite?

5 DR. MASSE: It's masonite, yes. Yeah.

6 MR. GLENN: Could you explain -- I think it was
7 observed that the background is higher when you have your
8 phantom in the chair than when the chair is by itself. Is
9 there an explanation for that?

10 DR. MASSE: Yeah. The masonite -- the masonite
11 has a little bit of natural radioactivity in it, and it
12 fairly closely simulates matter, in terms of natural
13 radioactivity. And so you will see a low increase when you
14 build the phantom in.

15 MR. GLENN: How about when you put a person --
16 well, what --

17 DR. MASSE: Well, that's your best background,
18 of course, is to put a real person in, because you --
19 potassium 40, that's in everybody, to reflect down through
20 the spectrum to get your true background, to strip off any
21 additional background for a subject.

22 MR. GLENN: You mentioned that early on the
23 exposed individual had been drinking a lot of liquids.
24 What effect would that have on the results?

25 DR. MASSE: It essentially -- it's not going to

1 speed up the elimination of P-32 once it is exchanged with
2 the calcium in the bone. All it does really is dilutes the
3 amount of P-32 that would normally come off in the urine.
4 And so if you're just looking at a grab sample and not
5 looking at the total activity, it's going to give you a
6 huge error, and it's going to vary from day to day.

7 MR. GLENN: Is that going to be a low estimate
8 or a high estimate?

9 DR. MASSE: It will give you a low estimate.
10 It will give you a low estimate, and that's why we went to
11 the full 24-hour collection. And the data that we've kept
12 for you and the samples that we've kept for you are now the
13 24-hour collection samples with an aliquot kept and with a
14 measurement of the total volume that was excreted. So you
15 can calculate it back to total activity.

16 And so what we've plotted in the part that we
17 sent to Betsy the day we reported this was a plot of
18 microcuries in urine on a day-to-day basis.

19 MR. SHERBINI: This 65 percent, is that
20 isotope-dependent, or is that more --

21 DR. MASSE: For uniformly distributed
22 materials. We did it with cesium primarily. Cesium is
23 going to be an excellent marker for P-32, of course. It
24 would -- obviously, if there's something that is gone, the
25 item wouldn't work at all because I haven't covered it

1 right in the thyroid.

2 But if there's something that's going to
3 isolate in one of your main organs, it's going to be
4 higher, because you're going to have it right in the view
5 of the chair and that's the way the chair was designed.

6 MR. SHERBINI: Which is the case with P-32.

7 DR. MASSE: No. For P-32, after the first six
8 or seven days, it is now pretty well uniformly distributed.

9 MR. SHERBINI: In bone?

10 DR. MASSE: In bone, yeah.

11 MR. SHERBINI: And --

12 DR. MASSE: Your best measurements of P-32 are
13 on the top of the head and on the kneecaps.

14 MR. SHERBINI: I was wondering if -- would 65
15 percent of the bone that you would --

16 DR. MASSE: Yeah. Yeah. I mean, I think it
17 would.

18 MR. SHERBINI: Okay.

19 MR. GLENN: Okay. I'm ready to I think move
20 off of the assay. Did someone else have a question?

21 DR. MASSE: Let me just answer to help
22 reinforce that. We found that the strontium-yttrium, the
23 65 percent worked perfectly for that on the strontium dial
24 painters. And the strontium-yttrium is going to follow the
25 pathway of P-32 pretty closely, too.

1 MR. GLENN: Go ahead.

2 MR. O'CONNELL: You mentioned that Canberra had
3 been marketing this chair as well, and they developed --
4 and you helped -- assisted them in developing a calibration
5 factor for the chair. Have you also done calibration
6 factors in-house? The reason I ask, Mitch mentioned that
7 he put together some P-32 -- he put into the phantoms and
8 two out of the three sections got the phantom.

9 DR. MASSE: Right.

10 MR. O'CONNELL: Which one was used in this
11 particular instance to perform a calculation of the total
12 model of activity projected for this individual?

13 DR. MASSE: Okay. What he would have used --
14 the three compartments of the phantom are the chest cavity,
15 the lower trunk section, and the thighs. The trouble with
16 the chest cavity is that the inserts for the chest cavity,
17 we don't -- we wouldn't use water jugs in there. What he
18 used was water jugs in the lower torso and the thighs.

19 MR. O'CONNELL: With P-32.

20 DR. MASSE: With P-32, the P-32 solution. The
21 chest cavity is a lightweight material. It's a
22 communicating cellular foam material, which we would spike
23 with an activity at the density of the lungs, okay? It
24 wouldn't be appropriate to put it there because this -- the
25 P-32 isn't going to be in the lungs.

1 The other does simulate the -- the thighs
2 particularly simulate the center of the thigh and the bone
3 in the thigh, which is probably the greatest mass of bone
4 that you've got in view there. Okay? And the other are
5 the internal organs, but it would give you a pretty good
6 simulation in the lower torso.

7 And it -- that's the way we calibrated when we
8 did the -- when we did the strontium and then later did the
9 intercomparison between the water phantoms and the solid
10 phantoms.

11 MR. O'CONNELL: So you used your own in-house
12 calculation versus --

13 DR. MASSE: Oh, yeah.

14 MR. O'CONNELL: -- the --

15 DR. MASSE: That's what we're doing now.

16 MR. O'CONNELL: -- commercially developed --

17 DR. MASSE: We're using the commercial program.
18 The commercial program now is a complete computerized
19 program. We can go back to a measurement that was made on
20 an individual before, and this is what Canberra put
21 together for us. We can go back to an individual who was
22 measured before.

23 The program -- you know, we could say this
24 gentleman was measured at a positive result three months
25 ago. Okay? The program will update that, what was there

1 three months ago, for elimination and decay. Okay? And
2 then measure -- take the new measurement, strip it out, and
3 tell you what is new. That's the way the system works.

4 MR. O'CONNELL: Okay. What's the name of that
5 program?

6 DR. MASSE: It's a Canberra program, but we can
7 give it to you. That's the way it works. And we use that
8 really today only on a screening basis, Tom, okay? Because
9 we're not doing that many people where we get any positive
10 results at all. We'll take a quick look at that, see if it
11 tells us anything. It does a peak search, it does an
12 isotope analysis. It does the whole thing.

13 And if we then see positive results, as we did
14 here, we'll go back in and do our own calibration and be
15 sure that we see what we think we're seeing. And that's
16 what we did here.

17 MR. GLENN: I've thought of one more question.
18 The calculation of the actual intake does depend upon some
19 excretion models in order to get back to the activity.

20 DR. MASSE: Right.

21 MR. GLENN: When applied to a specific
22 individual, how accurate would that model be expected to
23 be?

24 DR. MASSE: Well, I mean, the trouble with any
25 of these things is that it is all based on standard man.

1 The NUREG, as you know, was written by the people at the
2 Lowell, and we've talked to them to be sure that what we're
3 doing makes sense here. And, you know, we've -- and Joe
4 Ring, in fact, talked to them a lot more than we did and
5 made sense out of it in that sense, and they felt that what
6 we were doing was -- was reasonable.

7 And, of course, now, in hindsight, with all of
8 the data that we've got, as I said, with the agreement
9 between whole body and excretion, you couldn't beat that
10 with a stick. I mean, the agreement between the two and
11 the way they follow the anticipated numbers just is
12 perfect.

13 As a matter of fact, it's funny, because I've
14 had -- I've had them play with the numbers and look for a
15 best fit. That's another thing you could do with the
16 INDOS, okay? You can ask it, or you can play with it.
17 It's not that -- it's a very powerful program, but it --
18 they haven't done everything they can with it.

19 And so I asked them to go back and try
20 different initial intake times over a period of a few days,
21 to see where they get the smallest error and the best fit.
22 And the best fit is on Wednesdays, not on Monday, which is
23 very interesting. Okay? It really is clearly on Wednesday
24 for -- particularly for the whole body data, which is the
25 most solid data, because that first -- you know, is a four-

1 compartment P-32 release. And that the shape of the very
2 early days is important, and, unfortunately, we didn't know
3 about it for five days. We could have done even better if
4 we had known earlier.

5 But there is still enough of a shape up there
6 to show us that Wednesday fits better than Monday, in terms
7 of if we didn't know when it had occurred, or we didn't
8 have other indications as to when it had occurred, and went
9 back to it and asked it when it had occurred, it would have
10 told us Wednesday on Monday. And if it was Wednesday, then
11 the initial intake would have been a little under 500
12 microcuries, rather than 579. Okay?

13 MR. SHERBINI: Can INDOS estimate the intake
14 with greater emphasis on the earlier data, rather than the
15 iterative --

16 DR. MASSE: The iterative fit, the weighted
17 iterative fit takes it all -- takes it all, and it is
18 particularly -- it is noticeable and particularly important
19 on the urinary excretion data, because it gave more
20 emphasis, clearly, to the first month than the second
21 month, in terms of the fit. And that's the weighted
22 iterative fit, because the numbers are bigger, it's more
23 confident of the numbers.

24 Down later, you'll notice they drift around a
25 little bit, and it's a little hard to figure what is going

1 on down there. But it's more statistical than anything
2 else.

3 MR. SHERBINI: Yes. Because I tried weighting
4 the data, and I got a number that's higher than --

5 DR. MASSE: By INDOS or --

6 MR. SHERBINI: No, no, using --

7 DR. MASSE: Okay. Okay. All right. Yeah, we
8 got a lower number with the urine than we did with the
9 whole body count. So you got a number close to the whole
10 body count data, did you?

11 MR. SHERBINI: I used -- did the urine only. I
12 didn't --

13 DR. MASSE: I see. Okay. Yeah. So your urine
14 number came up a little bit with the different weighting?

15 MR. SHERBINI: With the different weighting,
16 yeah.

17 DR. MASSE: There is a little bit of funniness
18 toward the end of the urine data, yeah. In others -- I
19 mean, there is three rather prominent spikes about a week
20 apart in the latter part of the urine data.

21 MR. SHERBINI: The fit isn't as good towards
22 the end as it is in the beginning, right?

23 DR. MASSE: That's right. I had them go back
24 with the INDOS program and analyze those spikes, too. And
25 if you did that carefully, INDOS tells you that those could

1 be three additional five microcurie intakes, which is for
2 what it's worth. And he wasn't working in the lab at the
3 time.

4 But, I mean, it could just as easily be
5 explained with statistics, but we -- you know, we just
6 thought it was peculiar the way those three spikes really
7 soared up.

8 MR. GLENN: Is there any way to cross-compare
9 those spikes with the whole body data?

10 DR. MASSE: Couldn't see it in the whole body
11 data. Looked for it, couldn't see it in the whole body
12 data. Could have been lost in the notes, the whole body
13 data, but -- because, you know, it was getting down to
14 relatively small numbers at that stage in the game. That
15 was the first question I asked.

16 MR. GLENN: If you get a good fit based on this
17 model, does that indicate that the excretion functions are
18 appropriate for the individual you're looking at?

19 DR. MASSE: Yeah. Yeah, it does. I mean, you
20 wouldn't have -- you know, if the model that INDOS is based
21 on, which is the NUREG -- INDOS is based totally on the
22 NUREG. And you can, in fact, address INDOS and ask it for
23 excretion functions and go back to the exact same numbers
24 that you got in the NUREG. We've tested INDOS that way,
25 and it -- so the program was written like it does go back

1 properly.

2 So we think, you know, we've played with it
3 enough where we think everything fits. We have a -- I
4 mean, if there is something we've missed, then we'd love to
5 hear about it, because we've been wrapping ourselves around
6 this for a long time.

7 (Laughter.)

8 MR. GLENN: Is there any way to quantify I
9 guess not the statistical uncertainty, but the systematic
10 uncertainty?

11 DR. MASSE: Well, the systematic uncertainty,
12 according to INDOS, is very tiny. It's like two percent,
13 or -- it's really small. If you ask it for -- if the
14 uncertainty based on the whole body count, for example, is
15 down to like two percent. It's a very small number. It's
16 very confident there.

17 MR. GLENN: The next area I'd like to inquire a
18 little bit about is what is the policy of MIT with regards
19 to security of laboratories like Dr. Tonegawa's, where
20 people can work seven days a week, 24 hours a day, and, you
21 know, the laboratories abut and adjoin each other. What
22 would be the difference between an unrestricted and a
23 restricted area under those circumstances?

24 DR. MASSE: It's a nightmare, as you obviously
25 know. It's -- I mean, we have to consider all of these

1 and it's not easy.

2 MR. GLENN: Let me clarify whether I heard you
3 correctly as to what the policy would be under these
4 circumstances of the controlled area, would be that if no
5 one is there, that, in fact, the material should be under
6 lock.

7 DR. MASSE: Absolutely. Yeah, right. Right.
8 And if no one is there, their policy is to be sure that the
9 laboratory is locked up. Right.

10 MR. SHERBINI: In the -- just to make sure I
11 understand the controlled area, the purpose for
12 establishing controlled areas would be the security of --

13 DR. MASSE: No. It's so that we know that
14 these are areas in which radioactive materials may be used
15 under control, and these are areas that we will survey as
16 well as requiring that they survey.

17 MR. SHERBINI: Okay. So they are established,
18 essentially, to define the boundary where your people will
19 conduct the surveys.

20 DR. MASSE: That's correct. That's correct.
21 Areas where we would expect them to be working with
22 radioactive material.

23 MR. GLENN: Would employees working in the
24 controlled area necessarily need training or badging?

25 DR. MASSE: Anybody who is working with

1 radioactive material requires training, and we give enough
2 -- we give several training sessions a week, so that we
3 don't let anybody start work, even under the wing of
4 somebody in the department. We want them to be here and to
5 get trained, and a key part of that training is the
6 requirement for control of the materials, just as we're
7 discussing.

8 So the training is absolutely necessary. Very
9 few of our people actually require badging. Under the
10 likely-to-receive 10 percent rule, very few of our people
11 actually require badging. So visitors coming into the
12 laboratory on an occasional basis -- typically, it's a very
13 short type of thing. It's under one of those research
14 people as an escort, and we don't see any exposures, even
15 on our P-32 users, for the most part. We don't have any
16 concerns for the potential exposure to visitors. We just
17 don't think it's likely to occur.

18 MR. GLENN: As a part of MIT's review of this
19 incident, did you come to any conclusions about any
20 security problems in this particular laboratory?

21 DR. MASSE: Well, yeah. I mean, the action
22 that we took was to tighten up access to the radioactive
23 material that those people have access to. And that's
24 something that I'm wrestling with right now with respect to
25 the response to the -- to the initial letter that is due

1 next Tuesday. It is a tough call.

2 Our problem is that we've got thousands of
3 people in hundreds of laboratories who are properly trained
4 and authorized to work with unsealed radioactive material.
5 The question is, what have we done to prevent the
6 recurrence here of -- if this was just an accidental
7 ingestion, there isn't much you can do.

8 I mean, if you've got this many people with
9 access to this amount of material, there isn't much you can
10 do. If, in fact, it turns out to have been a malicious act
11 of some sort, then the action that we took I think is
12 effective and has been effective. And that's the only step
13 we can see. If we are guarding against that, then -- then
14 if we're guarding against a malicious act, then to lock
15 down the material under stricter control, and not giving
16 all authorized users free access to the material but access
17 only through a carrier on a sign-out, inventory control
18 basis, so that at least you know who has used what when,
19 and you have a little more responsibility for what you need
20 and when you need it.

21 And that's what we've done in Susumo's
22 laboratory, and we are looking at just how much of an
23 effect that might have campus-wide if we expanded it.

24 MR. GLENN: Can you describe what effect it
25 might be if you had requirements such as laboratories had

1 to be restricted to individuals with keys, and all
2 laboratory doors had to be locked? What kind of impact
3 would that have on your program?

4 DR. MASSE: We could require it, but I just
5 don't think it would be adhered to. I mean, you'd have
6 door stops every place in the institute, and it would be an
7 impossibility for us to try to control, and a nightmare for
8 NRC to try to inspect when they came in and looked at us
9 later.

10 I want to react properly to this incident. I
11 want to take reasonable steps, but I also -- I think we all
12 need to be aware that some things just don't work in an
13 academic setting such as this, and may be more than is
14 necessary to control it.

15 I think if we can control the radioactive
16 material, John, that that is the bottom line. If we leave
17 the laboratories reasonably accessible, as we do now, I
18 mean, there is a real flow of information in an open
19 academic setting like this. And it would be very difficult
20 to lock that down.

21 But if we make sure that the stock materials
22 are properly locked away, so that the only thing that
23 someone might have access to is a few microcuries of
24 material in process out on the benches, then I think we
25 have taken a responsible step in terms of control to

1 prevent this sort of thing.

2 We're talking about 500 plus microcuries here,
3 and it's that that we want to prevent. I don't think we
4 could possibly prevent a possible ingestion of five or 10
5 microcuries, to be honest with you. I think we have to be
6 practical about that aspect of it, you know.

7 MR. GLENN: Any followup questions?

8 MR. SHERBINI: Not really. Except in the
9 controlled areas, there are no access controls. In other
10 words, people are free to come in and out.

11 DR. MASSE: That's correct. That's correct.
12 It's controlled only because there are people working in
13 that area, and if some stranger were to be there, they
14 would be -- they would be challenged. And I believe that's
15 -- I mean, I don't think any of us could -- I mean, the
16 tipoff for me would be a suit. If I walked in there, they
17 would -- I would immediately be caught, and you too.

18 (Laughter.)

19 You guys might get in.

20 (Laughter.)

21 So -- but, you know, I've had that. I mean,
22 I've just walked in. I don't get into the laboratories. I
23 mean, my job is behind desks, okay, in three offices here.
24 I don't get into the laboratories as much as I used to.
25 And, you know, if I walk in alone -- I usually go in with

1 Mitch, or with Don, or somebody like that. But if I walked
2 in alone, I'll be challenged. And that's the way it ought
3 to be. That's the way it ought to be.

4 Everybody is alert to the fact that, you know,
5 you're living in an inner city, and that, you know, that
6 you need to keep tabs on things. You know, they are all
7 careful to lock their cars when they park their cars
8 outside, too, so it's a consciousness in the inner city.

9 MR. GLENN: Okay. The next area is related,
10 but it's a slightly different subject. This has to do with
11 how does the responsibility or accountability for material
12 get passed down through the organization? I guess you
13 issue permits to authorized users, and then there are
14 people who work under their supervision. How does the
15 responsibility for controlling the material get passed
16 through that chain?

17 DR. MASSE: Okay. I mean, I like to think that
18 we're operating something akin to an agreement state
19 program. It's probably larger than most of the agreement
20 states, okay? Just with the amount of activity that goes
21 through MIT and the number of people that are working here,
22 and that's -- the number of permits that we have and the
23 size of our staff, as a matter of fact.

24 We issue sub-licenses is what it amounts to,
25 authorizations as we call them. They are all approved by

1 the committee, and we have responsible principal
2 investigators over each department -- Susumo/Tonegawa in
3 this particular case. And he has, under his umbrella, he
4 has listed people like Dennis King, who will be responsible
5 for management and oversight within his laboratory.

6 They submit a request for permission to use a
7 quantity of radioactive material and give us a listing of
8 the people who will be working with the material in that
9 laboratory. And we then grant them conditions of approval
10 with the approved authorization, and they are bound to
11 that. Now, you know, they have proposed these conditions
12 of approval when they apply for the application, not unlike
13 applying for a license. Okay?

14 And then we will maybe impose something extra
15 on there. But, you know, we will -- we will authorize it
16 in that way. We make sure that everybody who is listed as
17 a user on that authorization has been properly trained and
18 is in our files. And then we monitor the laboratory based
19 on that set of agreements, if you will.

20 We renew these authorizations every two years.
21 We require that they submit an application for renewal. It
22 can be a simple application, if there's very little change.
23 It needs to be detailed if there is a lot of change.

24 Our retraining, by agreement with NRC, is on a
25 two-year basis, and it is tied to that renewal process.

1 Rather than bring everybody in once a year and repeat what
2 they heard in their initial training, and bore them all to
3 death, we go into the laboratory as the authorization is
4 renewed, meet with them in the laboratory setting with the
5 principal investigator there, and go through their
6 authorization in detail, going through all of their
7 conditions of approval and what they've agreed to, and what
8 we've imposed on them.

9 So it's, I think, a meaningful update on their
10 training. It seems to work a lot better as far as we're
11 concerned. We don't have any problems getting the
12 attendance, and they're interested in what we have to say
13 at that stage of the game. So it seems to work quite well.

14 MR. GLENN: Would this training include the
15 principal investigator themselves?

16 DR. MASSE: Yes, it does. Yeah, yeah. Right,
17 yeah.

18 MR. SHERBINI: To push the agreement state
19 analogy further, would they be responsible for accounting
20 for the material they receive, and checking the wastes,
21 and --

22 DR. MASSE: Yeah.

23 MR. SHERBINI: Or is that --

24 DR. MASSE: Don't forget, we authorize every
25 purchase, and we -- you know, we -- that gives them a

1 possession limit. Okay? The authorization gives them a
2 possession limit. Everything they buy they have to buy
3 through us. All incoming shipments of radioactive
4 materials come in through us. We hand-deliver all of the
5 material that comes in through a central receiving station
6 here. We check it all in.

7 We hand-deliver it to the laboratory and turn
8 it over to the responsible party in the laboratory, and we
9 process all of their waste. They are supposed to keep
10 records on how the material is used. It is better in some
11 areas than it is in others. I was amazed, frankly, that
12 they were able to give us an inventory accounting as good
13 as they did. But I was pleased. I mean, that's what
14 they're supposed to be able to do. But, you know, I was,
15 frankly, quite pleased to see that it was as good as it
16 was.

17 MR. SHERBINI: Would they be responsible for
18 making sure they stay, say, within their possession limit?

19 DR. MASSE: Oh. When they order a new
20 shipment, they are required to include -- it's a special
21 purchase order, and they are required to tell us how much
22 they have on hand at the time they place the new order.

23 MR. SHERBINI: Okay. So you check that.

24 DR. MASSE: So we check that, yeah. Yeah.

25 MR. GLENN: Would it be appropriate, under the

1 permits that you issue, for an investigator in one
2 laboratory to borrow or obtain isotopes from another
3 researcher?

4 DR. MASSE: We allow it, but we are supposed to
5 be advised of it, and are supposed to cross-check that
6 inventory as it goes back and forth. We stopped it in
7 Tonegawa's laboratory before this incident. It is a
8 problem area. We don't want to stop the work.

9 I mean, if they are short 50 microcuries of P-
10 32 to do a task, and they've got a lab next door, we have
11 allowed them to do that. But we have required that they
12 keep records of what they're doing. We may tighten that
13 up. We may tighten it. We had to stop it here, because we
14 did not want that to occur when we shut the lab down, when
15 we shut down their access to radioactive material.

16 And we had not reauthorized that since we've
17 had the tight controls on the radioactive material in that
18 laboratory. And it's a troublesome area, and it may be
19 that now we have to really tighten up on that particular
20 area. That's a common problem in a university setting.

21 MR. SHERBINI: The routine, as I was led to
22 understand it, is that a lab such as Dr. Tonegawa's has a
23 standing order for the isotopes that they use repeatedly.

24 DR. MASSE: Right.

25 MR. SHERBINI: These might come in, say, every

1 week. They would be put into the refrigerator, which acts
2 as a common supply for everybody to use. So it's not a
3 specific order for a specific researcher, but --

4 DR. MASSE: That's right.

5 MR. SHERBINI: -- it's a common pool.

6 DR. MASSE: Right.

7 MR. SHERBINI: It's used for --

8 DR. MASSE: They're all in -- and that's
9 particularly true of those radioactive materials that are
10 used commonly throughout the laboratory. Right, right.
11 And the compound that they're using. If there's a specific
12 compound that one individual wants, that would be treated
13 differently.

14 MR. SHERBINI: Well, I also understood that
15 people who take things out of the refrigerator, isotopes
16 out of the refrigerator, aren't really required or don't
17 note how much they took out, and so the system is that
18 since there is a constant supply coming in, then it's --
19 their use will sort of be in balance with what keeps coming
20 in every week. And so there is no need to write down that,
21 you know, I used 50 now and 50 tomorrow.

22 DR. MASSE: That's correct in the past. It is
23 not correct in the present in Tonegawa's laboratory. And
24 even though that was there in the past, when push came to
25 shove and we needed to know who had used what, it was all

1 there in the notebooks.

2 MR. SHERBINI: Okay.

3 DR. MASSE: Okay? We could get all of the
4 information we wanted in their notebooks.

5 MR. SHERBINI: Okay.

6 DR. MASSE: Everybody -- you know, somebody had
7 done an experiment on Tuesday. They write in their
8 notebook they had withdrawn 50 microcuries and they had
9 used it, or 100 microcuries and they had used it. We were
10 able to pull all of the data together from the notebooks.

11 MR. SHERBINI: And I guess that's how you did
12 the inventory.

13 DR. MASSE: That's exactly how they did the
14 inventory, right. So the data was all there.

15 MR. SHERBINI: Yeah.

16 DR. MASSE: And it is now there in a much
17 better way, because there is a central party keeping the
18 data as they dispense it as people request permission to
19 use.

20 MR. GLENN: Well, a clarification. In the
21 inventory that was performed, was all of the material
22 accounted for, or was there a discrepancy?

23 DR. MASSE: There was a 500 microcurie gap, and
24 it happened to be all in the vial that was received on the
25 day of the -- that has been projected as the day of intake.

1 That's right.

2 MR. SHERBINI: Is that -- it was identified as
3 actually being in that vial or --

4 DR. MASSE: That vial -- later in that week,
5 someone -- I mean, the records were good enough that they
6 were projecting that there was -- there was 550 or 600
7 microcuries left in that vial, and somebody went to
8 withdraw from it and it wasn't there.

9 MR. SHERBINI: Oh. So the vial was empty.

10 DR. MASSE: No, there was a little bit left.

11 MR. SHERBINI: Oh, okay.

12 DR. MASSE: But there was a 500 microcurie or
13 450 microcurie gap.

14 MR. SHERBINI: Yeah.

15 DR. MASSE: And we have that vial. I mean,
16 that was something that we confiscated with --

17 MR. GLENN: Oh, okay.

18 DR. MASSE: -- all of that material. We've had
19 that vial set aside down in our hot lab. We notified the
20 campus police of that early on, and we still have that.

21 MR. SHERBINI: Was that the special material
22 that --

23 DR. MASSE: No.

24 MR. SHERBINI: I'm curious because, I mean,
25 what -- this particular vial, I mean --

1 DR. MASSE: Well, it happened to come in that
2 day. Everybody looks for the latest vial.

3 MR. SHERBINI: Oh, I see.

4 DR. MASSE: Everybody looks for the latest
5 vial. Everyone wants the freshest material. They want the
6 highest specific activity they can get.

7 MR. SHERBINI: Okay.

8 DR. MASSE: And it happened to come in that
9 day. And when somebody was looking for it a couple of days
10 later, they had a running account of how much had been
11 removed from it, and low and behold there was 500
12 microcuries or 450 microcuries that was unaccounted for.

13 MR. ENN: What time of the day did that come
14 in?

15 DR. MASSE: It comes in late morning.

16 MR. GLENN: Late morning?

17 DR. MASSE: Yeah.

18 MR. O'CONNELL: Is it correct in my
19 understanding that when the P-32 first comes in from the
20 manufacturer that it can be actually over? Say, that one
21 millicurie amount is actually pre-dated? So, in other
22 words, when it came in on Monday, it could have actually
23 been more than --

24 DR. MASSE: That's why they set it up on a
25 weekly delivery. Okay?

1 MR. O'CONNELL: Okay.

2 DR. MASSE: But what the manufacturer does is
3 makes up a weekly batch and puts it on the shelf. Okay?
4 And they put it on the shelf with a shelf life of like two
5 weeks. So if you order it -- and they've got it set up so
6 they get their delivery on the day of the week when it's a
7 fresh vial. And they will continue to sell that vial for
8 two weeks, and two weeks later they want it still to be two
9 millicuries if that's what you ordered.

10 So when they first put it on the shelf with a
11 14-day half-life, it's going to be there for two weeks.
12 It's going to be four millicuries, and they sell it to you
13 as -- it's normally a two millicurie vial dated two weeks
14 later. Okay? So you are actually receiving four
15 millicuries instead of two.

16 This has been a problem, as you know, in
17 medical from -- you remember that from when you were --
18 when you were doing medical in --

19 MR. GLENN: Yes.

20 DR. MASSE: -- the techniques in generators. I
21 brought that problem to your attention. They were shipping
22 -- people that have a license for a 500 millicurie
23 generator were receiving a two curie generator every week,
24 and I made that problem known to the regulators and said,
25 "You know, do you realize what's going on here, folks?"

1 And so that's when you changed Part 35 to cover whatever
2 you need.

3 MR. O'CONNELL: The quantity that's in --
4 everybody counting up their notebooks --

5 DR. MASSE: It's all decay-corrected.

6 MR. O'CONNELL: That's all decay-corrected,
7 right. That to --

8 DR. MASSE: Yeah, the whole inventory is decay-
9 corrected.

10 MR. O'CONNELL: Decay-corrected back to what
11 was probably in that vial when it was received?

12 DR. MASSE: Exactly. Yeah. Everything is
13 accounted for on that basis, right.

14 MR. GLENN: So this practice would not cause a
15 laboratory to exceed their possession limit.

16 DR. MASSE: Exactly.

17 MR. GLENN: You would know.

18 DR. MASSE: We would know, oh, yeah. We
19 account for it, too, you know, so we know what they're
20 getting.

21 MR. SHERBINI: What kind of -- you know, now
22 that the material is locked with limited access to it, does
23 that represent much of research --

24 DR. MASSE: Apparently, it has not and I am
25 delighted to hear that. You know, because we've talked

1 about this in the past and got nothing but screams. Okay?
2 And now we have a demonstration that, indeed, it works. So
3 we are going to take full advantage of that.

4 MR. O'CONNELL: So at this point in time, there
5 are stricter controls on the Toneygawa --

6 DR. MASSE: Just on the Toneygawa group, right.
7 Right, yeah. Yeah.

8 MR. GLENN: Are you considering expanding that?

9 DR. MASSE: Yeah. To be honest with you, I --
10 you know, I thrashed with it last night, and I decided
11 that, you know, I imposed this as the RSO in the Toneygawa
12 group, given the circumstances. But I think if I imposed
13 it institute-wide at this stage in the game, I probably
14 would have a mutiny on my hands.

15 So I think what I'll do is call a special
16 meeting of the committee, which is a faculty committee, and
17 present it to them, and propose that the committee
18 institute it. I mean, that's the reason for a committee,
19 and the committee is on the license as the responsible
20 group here. Let the committee impose it on everybody else,
21 and then I can hide behind the committee.

22 (Laughter.)

23 You learn that very well in an institution like
24 this. Even with a faculty title, I still like to hide
25 behind the committee.

1 (Laughter.)

2 We have nine Nobel Prize winners that we have
3 to regulate every day. It's -- nine active Nobel laureates
4 on campus that we have to regulate every day. So I like to
5 have somebody to hide behind.

6 (Laughter.)

7 MR. GLENN: Any more questions in this area?

8 The next area I'd like to go into is look a
9 little bit at the response that took place on August 19th,
10 once the individual identified that he was contaminated.
11 Could you review for us what he did, and I guess also
12 comment on whether he was following your procedures as he
13 did each of these?

14 DR. MASSE: It's my understanding, in
15 retrospect, that it was some hours before he called us, and
16 some hours before he asked for help. And he had not only
17 done a lot of surveys in the laboratory and of other people
18 in the laboratory, but even collected and measured his own
19 urine before he finally called. And that certainly is not
20 in the orange book.

21 (Laughter.)

22 I mean, we want to get the call. You know, our
23 policy is, as you well know, John, is that we are here to
24 help you and we are here to help you do it right, and I
25 believe we have always demonstrated that in every reaction

1 we've ever had within the campus. And, you know, we're not
2 policemen, and that's not what we're here for. So there's
3 no reason not to call us. We'll help you in any way we
4 can. Why he took the time to make his own measurements,
5 and so forth, is peculiar to me to this day.

6 I mean, this is a man who has been here five
7 years, and he has been through many trainings, and he is
8 well known to us. You know, this is an individual, a five-
9 year post-doc, is somebody who is known by sight to the
10 staff people who work in that area. And, in fact, when he
11 did call, and Don and Mitch came in, they both knew him,
12 knew who he was, and this was not a new meeting by any
13 stretch of the imagination.

14 So he -- you know, it was somewhat surprising
15 that he followed the path he did, and even more surprising
16 that he took it upon himself to force fluids and that sort
17 of thing. I think that I was concerned about his well
18 being when we recognized that the first time I asked him
19 for 24-hour urine collections, and he brought in five and
20 six liters. I mean, he was bringing in, you know, gallon
21 jugs, you know, and running out of containers faster than
22 we could supply them. And I said, "What is going on here?"

23 I was really surprised and concerned for his
24 metabolite balance, you know, and that's when I spoke to my
25 boss, who is a medical doctor, an occupational physician,

1 and said, you know, will you talk to this guy and tell him
2 to cut it out? He is going to hurt himself. There's no
3 way -- I mean, if it has been -- the P-32 has been in the
4 body for a week, it is on the bone and you're not going to
5 flush it out, and there's no point in even trying.

6 And he -- apparently, he had advice from
7 another physician to force fluids, and that's what he was
8 doing.

9 MR. GLENN: My understanding is that rather
10 than calling Radiation Safety directly he called the
11 police. Is that, in fact, the procedure that --

12 DR. MASSE: That's the procedure. After hours
13 notification here, we've got a dial 99 technique, an
14 emergency phone service that goes through campus patrol, is
15 tied in also and monitored at the medical department. They
16 have a 24-hour on-call list from EMS, and so we are called
17 on that basis. There is somebody always on call, 24 hours
18 a day, seven days a week, and that's how the -- that's how
19 the call is made.

20 MR. GLENN: Do you know how the -- when he made
21 the call to the campus police, how they responded?

22 DR. MASSE: They got him over to medical. When
23 Mitch and Don came in here, I believe he was already at
24 medical and they reported to medical. I got a call. I was
25 at the opening of an art exhibit as a matter of fact. I

1 got paged around 6:00, and I must admit I didn't drop
2 everything. I mean, when you get paged as often as I get
3 paged, you don't -- after a while, you don't drop
4 everything. I called within probably 45 minutes, and I had
5 a pocket phone with me, and so as soon as I got away I
6 called.

7 I talked to campus police. They put me in
8 touch with the medical department where he was, told me
9 that Mitch and Don were on their way, and I said fine and
10 it was under control, and I said, you know, "I'll be home
11 within the hour. Have them all feel free to call me."
12 And, you know, we then were in touch and were talking most
13 of the night I think, back and forth.

14 MR. GLENN: For a contamination incident, was
15 that what you expected the police to do, to take him to the
16 medical center or --

17 DR. MASSE: Yeah. Yeah. That was a -- we do
18 have a decontamination room, if it were an external
19 contamination. There's a shower and a decon. or clothing
20 changes, and that kind of stuff, with -- I mean, there's
21 chelating agents over there and special soaps for -- to
22 help with external decontamination and that sort of thing.

23 And so -- and, in fact, one of the things that
24 -- I just got a memo a couple of days ago reminding me that
25 I've got to go and check that and be sure that the supplies

1 are as they should be. So that's one of the things I've
2 not to do.

3 MR. GLENN: Do the campus police have a
4 procedure that tells them what to do?

5 DR. MASSE: Yeah. The campus police, don't
6 forget, are in the loop for the reactor, too, for -- and
7 the reactor we have -- we have an incident drill at least
8 once a year with the reactor, including the Cambridge fire
9 and police, and our larger decontamination agreement is
10 with Mass. General. We go through an annual drill,
11 particularly around this time of the year, with the campus
12 police on handling incidents of that sort.

13 And campus police are even in the loop to use
14 the cruisers to do area monitoring around the reactor in
15 case of a reactor incident. So, again, we have them
16 very much.

17 MR. SHERBINI: So they have survey --

18 DR. MASSE: Have survey instruments, right.
19 And we get into rather extensive training with them on an
20 annual basis.

21 We also train just for the city, because we are
22 good citizens. We train the Cambridge Fire Department and
23 the hazmat team, and Cambridge police on an annual basis
24 voluntarily, too.

25 MR. GLENN: Any --

1 MR. SHERBINI: How about the medical stuff?
2 Would they know what to do if -- say, if this was a larger
3 intake, and he needed to take, say, any blocking agents
4 or --

5 DR. MASSE: Yeah. Oh, yeah. Yeah. That's --
6 as I said, they have a supply of chelating agents, SSKI,
7 and that sort of stuff. They would call me, or Mitch in my
8 absence, but absolutely, they are -- and there are a couple
9 of key people. My boss, who happens to be in France at the
10 moment, but Dave Diamond backs him up, and he is -- Dave is
11 a medical doctor over at the medical department, and he is
12 the backup on this sort of thing. And both of them would
13 know what medical intervention must --

14 MR. SHERBINI: So that he can know -- it's
15 listed somewhere, so that he can know --

16 DR. MASSE: Oh, yes. Oh, yeah, yeah. The
17 medical department is a relatively small -- it's -- well,
18 it's actually not a small group. It runs an HMO for the
19 MIT campus. This is a city of 20,000 people here, so --
20 and it runs an HMO for the students and the faculty and
21 staff. And so it's a good sized medical department.

22 But the core is a very familiar group of
23 people, and -- that have been here for a long time. So
24 it's well known who does what.

25 MR. GLENN: Okay. In terms of the decision

1 whether to report it to the NRC or not, could you just
2 explain to us the different processes you went through --
3 mental processes -- when deciding whether --

4 DR. MASSE: Right, right.

5 MR. GLENN: -- whether to report it or not.

6 DR. MASSE: No. I -- you know, I would -- as I
7 said, I immediately looked at the regs. to see what -- to
8 see what the requirements were, and my quick judgment was
9 that it's not an immediate reporting or a 24-hour reporting
10 requirement.

11 And, you know, as we began spending significant
12 time on it in the following week, I was looking primarily
13 at the 30-day reporting requirement for something that was
14 over an ALI. And that was really the only thing left. The
15 other stage 1/stage 2 requirements we hadn't come close to,
16 and everything bears that out. It's really just the
17 approach of the ALI.

18 And as I said, early on, I mean, the number was
19 in the 300, 400 range, up until well beyond mid-September,
20 let's say. More than 30 days later, we were still well
21 down in. It wasn't until we really began to pull
22 everything together under INDOS that -- we don't have a
23 permit to operate INDOS. I never spent the money for it.
24 But when Joe Ring came into the picture, he does, and so we
25 were able to use Joe's access to INDOS. And so that's when

1 we started looking at it on that basis.

2 And my guys are taking graduate courses with --
3 one of them is in a Ph.D. program, or two of them are in a
4 Ph.D. program with Ken Skrabble up at Lowell, and Ken makes
5 sure that everybody has their own personal copy of INDOS.

6 (Laughter.)

7 And so it's -- you know, I don't know how legal
8 it would be for me to use that per se, but we at least had
9 it in the computers and were able to play with it. And
10 using Joe as our cover --

11 (Laughter.)

12 But INDOS we felt gave us the best number.
13 Even though it was a higher number than we had been looking
14 at before, we felt that it took all of the data into
15 account, and it -- and using the data with INDOS, really, I
16 think is the best estimate. And that's all I've ever
17 looked for is the best estimate of his intake.

18 MR. GLEN: In hindsight, were you -- you ended
19 up with a result that's about four percent below the limit.
20 Do you think maybe you should have done something different
21 or --

22 DR. MASSE: No, I don't. I really don't. I
23 think, you know, I mean, a number is a number. I mean, you
24 people put 600 in the regulations, and, you know, I trust
25 you.

1 (Laughter.)

2 You didn't say nearly 600, or anything. You
3 said 600. And I felt you had a good reason to do that. I
4 think the criticism in nature that two years ago, you know,
5 we would have had to report this at a quarter of this, you
6 must have had some good reason for changing the
7 regulations, you know, and so why am I -- why should I
8 bother you just because it might have been reportable two
9 years ago.

10 And you know, I mean, if we were concerned
11 about the public interest, about public exposures, about
12 anybody else getting exposures, sure. I mean, I -- you
13 know, obviously, then I would have called for help. You
14 know me, John. You know me well enough to know that if we
15 really need help we'll be in touch.

16 But we controlled everything, and I think we
17 did as good a job as anybody could have done to get
18 everything under absolute control. And I think that the
19 experience of the last six weeks since we imposed controls,
20 that bears this up. I think we did as well as anybody
21 could do to make sure that this is under control, and we've
22 done as good as anybody could have done in terms of
23 refining the measurements.

24 MR. SHERBINI: I guess John's question could be
25 rephrased. You know, the final number I guess could easily

1 (Laughter.)

2 You didn't say nearly 600, or anything. You
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22 done as good as anybody could have done in terms of
23 refining the measurements.

24 MR. SHERBINI: I guess John's question could be
25 rephrased. You know, the final number I guess could easily

1 have been 700 as 597.

2 DR. MASSE: Sure. And as soon as the final
3 number was 700 -- as I said, all along, Sami, I have been
4 looking for the best estimate at intake. And if the number
5 came up as 700, you would have heard from me right away. I
6 mean, that's -- no problem with that at all. The
7 regulations, as I read them, say once we are aware of
8 something over an ALI, or something over five rem
9 occurring, that's when we notify you.

10 And if the number -- you know, if INDOS had
11 brought it up above 600, you would have heard from us right
12 away. I wouldn't have waited 30 days, although the
13 regulations I think allow me to. But once we really had a
14 handle on it, if it had gone over 600 we would have called.

15 MR. SHERBINI: You know, we've been talking
16 with Dr. Li many times, and he seems to have had many
17 reasons for disagreeing with your people, and to lose
18 confidence in your people. Could you shed some light on
19 why this might be so?

20 DR. MASSE: I can tell you some of our
21 experiences. I'm not sure I can shed any light.

22 (Laughter.)

23 It's amusing. I told you about what led to our
24 bringing Joe Ring on board. Okay?

25 MR. SHERBINI: Yes.

1 DR. MASSE: He wanted a bigger number. From
2 day one, he wanted a bigger number. I don't know why. I
3 can't answer that. Okay? He wanted it to be reported as
4 widely as possible, and we told him from day one, "You are
5 perfectly free to report this, but we don't feel the
6 regulations are clear as far as our reporting obligation
7 goes." Okay?

8 MR. SHERBINI: Did somebody tell him that he
9 can contact NRC?

10 DR. MASSE: Oh, yeah. I mean, he -- 3 is
11 posted over there everywhere, and we showed him a copy of
12 3, and showed him how to notify you. He did not want to
13 report this himself.

14 MR. GLENN: You specifically went over the
15 Form 3 with him?

16 DR. MASSE: Yes. Yes.

17 MR. GLENN: Do you remember what kind of --

18 DR. MASSE: It was posted in the other room one
19 day when we were talking. Early on, in the first week or
20 so.

21 MR. GLENN: Within the first week.

22 DR. MASSE: Yeah, right. But he didn't want to
23 report it. He wanted us to report it. Then, when we
24 brought in Joe Ring, he relaxed. Okay? I mean, that was
25 because he had no confidence in us. He wanted the number

1 to be larger. When we brought in Joe Ring, he relaxed.
2 Okay? When Joe Ring reported his number to us on Monday,
3 and his number agreed with us, he told Joe that he was
4 going to seek another expert for a third opinion. So I
5 feel that I'm in good company.

6 (Laughter.)

7 MR. GLENN: No, I -- you know, there have been
8 a lot of things with Yuging, and I -- you know, I don't
9 know whether it's a cultural thing. I just don't
10 understand Yuging, to be honest with you. And there are a
11 lot of things with him that I don't understand. I have
12 never ever felt that he has been open and honest with us.
13 I mean, I always have felt that he is holding something
14 back.

15 When you spend hours with him, as we've done
16 many times, going over numbers or analyzing data, or what
17 have you, every now and then something additional will come
18 out that you wonder where it comes from. I mean, several
19 times he has told us that the real number is 679. What
20 does that mean, and where does that come from? Almost as
21 if he knew what he took in.

22 (Laughter.)

23 You know, there has always been something very
24 puzzling about this, and we've all had the same feeling
25 that, what does he know that he is not telling us? It has

1 always been there. I don't know how to deal with it. You
2 know, 42 years in this business, I -- this is a first for
3 me.

4 MR. GLENN: Along those lines, do you know how
5 widespread the knowledge was of a previous incident that
6 occurred at NIH during this time period? Are people
7 talking about it?

8 DR. MASSE: This was within days of the half-
9 page article in Science. His intake was within days of the
10 half-page particle in Science. And everybody over there
11 knew about that Science article.

12 MR. GLENN: Okay. I think that finishes my
13 questions.

14 MR. SHERBINI: Mine, too.

15 MR. O'CONNELL: I guess there's just a couple
16 of other administrative things left.

17 MR. GLENN: Okay.

18 MR. O'CONNELL: To take care of, as far as, are
19 we giving him a phone number, in case you want to --

20 MR. GLENN: Oh, yes.

21 MR. O'CONNELL: Okay. I was just wanting to --

22 MR. GLENN: Okay. Finally, is there any area
23 we haven't covered that you think you need to bring
24 information to our attention?

25 DR. MASSE: No, not that I can see. I don't

1 think so. I think everything is covered.

2 At some point in time, I would like to just
3 chat off the record about my feelings relative to this
4 investigation, and a fairness issue, if you will, between
5 the Commission and MIT on the way things are presented, and
6 that sort of thing. We've got time for that later.

7 MR. GLENN: But it doesn't relate to the
8 factual --

9 DR. MASSE: Not at all. Not at all.

10 MR. GLENN: -- record, right?

11 DR. MASSE: Right.

12 MR. GLENN: Let me just remind you again, in
13 terms of the transcript, that you do have the right to
14 review the transcript and make corrections. Now, you have
15 to do it under the watchful eye of our administrative
16 staff, who will see that, you know, you don't take the
17 transcript away.

18 DR. MASSE: Right.

19 MR. GLENN: You already have a copy of this.

20 DR. MASSE: Yes.

21 MR. GLENN: You gave it to me the other day.

22 DR. MASSE: And I have to go in and review the
23 transcript from Tuesday's session.

24 MR. GLENN: And if you need to make
25 arrangements, you can call our administrative group at -- I

1 think it's 253-9392.

2 DR. MASSE: Okay.

3 MR. GLENN: And -- or walk by and let them know
4 that you --

5 DR. MASSE: I know where to find them.

6 (Laughter.)

7 MR. GLENN: And, obviously, if you learn of
8 anything you think we need to know about --

9 DR. MASSE: Okay.

10 MR. GLENN: -- if you would give us a call and
11 let us know.

12 DR. MASSE: Okay. Now, I am supposed to be at
13 an NCRP meeting in Washington on Monday. Is there any
14 problem with my being --

15 MR. GLENN: I don't believe there is going to
16 be any problem with that.

17 DR. MASSE: You'll be here when I get back?

18 MR. GLENN: Yeah.

19 (Laughter.)

20 DR. MASSE: I was afraid of that.

21 (Laughter.)

22 MR. GLENN: Okay.

23 DR. MASSE: And you're arranging, as I
24 understand it, for some of my people to come in tomorrow,
25 and that sort of thing.

1 MR. GLENN: Yes.

2 DR. MASSE: Okay. And I wish -- you know, so
3 continuing on --

4 MR. GLENN: Okay. It's now 3:19, and the
5 interview is concluded.

6

7

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 FRANK MASSE

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
Neal R. Gross and Co., Inc.