

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title: INTERVIEW OF DONALD L. HAES, JR.

Docket Number: ---

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Date: OCTOBER 20, 1995

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Pages 58

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## ADDENDUM

Page	Line	Correction and Reason for Correction
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7	1	"EUGENE" IS SPELLED "YUQUIN"
---	---	------------------------------

7	13	NOT "IN" INACCURATE, SHOULD BE "AN"
---	----	-------------------------------------

11	7	"EUGEN" IS SPELLED "YUQUIN"
----	---	-----------------------------

11	13	" " " " " "
----	----	-------------

12	15	" " " " " "
----	----	-------------

12	19	" " " " " "
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13	12	" " " " " "
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16	1	"AIR" BARS IS "ERROR" BARS
----	---	----------------------------

19	14	"YUQUIN"
----	----	----------

25	22	"PAM" SHOULD BE "THEN"
----	----	------------------------

33	5	"MIL" SHOULD BE "MI"
----	---	----------------------

33	7	"REB" SHOULD BE "RAD"
----	---	-----------------------

33	8	"MILS" SHOULD BE "MIS"
----	---	------------------------

33	16	"EXCUTED IN IT"
----	----	-----------------

34	24	"WAS" SHOULD BE "WITH"
----	----	------------------------

35	1	"MIL" SHOULD BE "MI"
----	---	----------------------

36	1	" " " " " "
----	---	-------------

44		<del>EXEM - MY ANSWER OF "NO" IS MISSING</del>
----	--	--

46		<del>MIS LECTURE'S QUESTION IS NOT ALL THERE</del>
----	--	--

54	1	"THE" SHOULD BE "NEW ENGLAND"
----	---	-------------------------------

54	8	"ZENON" SHOULD BE "XENON"
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NOTE: THE NUMBER OF USERS MENTIONED IN PAGE 29 LINE 13 IS ACTUALLY 228, THE NUMBER OF AUTHORIZATION ON PG 31 LINE 20 IS 35. THE "CANBORA" LSC IS REALLY A

Page 1 Date 10/21/95 Signature

*[Signature]*

"PACKARD" (A CANBORA C.) AND I USED A 20ml VIAL, NOT 20ml

IMPROVED  
PAGINATION  
PG 44-47

ADDENDUM

Page      Line      Correction and Reason for Correction

LSC      ON      PAGE 35 LINE 25.

Page 2 Date 10/1/95 Signature [Signature]

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2

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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 DONALD L. HAES, JR.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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FRIDAY, OCTOBER 20, 1995

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INTERVIEWERS:

20

BETSY ULLRICH

21

ALAN MADISON

22

23

24

25



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

(1:42 p.m.)

1  
2  
3 MS. ULLRICH: It's 1:20 p.m. on October the  
4 20th. This is an interview with Donald Haes. And what I  
5 want to do first -- my name is Betsy Ullrich. I'm with the  
6 Nuclear Regulatory Commission, and I'm a health physicist.  
7 Introduce Alan --

8 MR. MADISON: Alan Madison. I'm with the  
9 Nuclear Regulatory Commission out of headquarters in  
10 Washington.

11 MS. ULLRICH: And before we go any further, I  
12 just want to go through the -- a couple of statements that  
13 I want to make sure I cover before we go any further about  
14 why we're doing the investigation. We're here with the  
15 incident investigation team, as you know. The purpose of  
16 the team is to try to establish what happened with regard  
17 to the contamination incident with Dr. Li.

18 If possible, to identify probable causes and to  
19 provide feedback to both the academic and research  
20 community as well as to the Regulatory Commission regarding  
21 things that can be done to prevent such an incident in the  
22 future. The reason that we are doing interviews is because  
23 we would like to get facts from people who were directly  
24 involved with the event.

25 And we are transcribing the interviews mostly

1 for the purpose of not having to take notes while we're  
2 talking to you. We'll have a record that we can go back  
3 and review later, and you will also be afforded the  
4 opportunity to look at that transcript as well. And at the  
5 end of the interview, I'll give you all the details of what  
6 you need to do to look at your transcript.

7 MR. MADISON: You may want to describe a little  
8 bit more what he's going to do when he reviews his  
9 transcript.

10 MS. ULLRICH: I can do that if you'd like. I  
11 thought we were doing that at the end of the interview.

12 MR. MADISON: The transcripts are available  
13 within 24 hours. You can call and either set up an  
14 appointment or just come over at your convenience and we'll  
15 arrange for you to be able to review your transcript of  
16 this interview. At that time, you'll be given an addenda  
17 sheet. And if you find any corrections, any  
18 misinterpretations possibly that came out that you would  
19 like to make a correction, clarification, it can be done on  
20 the addenda sheet.

21 There won't be any marking on the transcript.  
22 The addenda sheet does become part of the transcript  
23 afterwards.

24 MR. HAES: Okay.

25 MR. MADISON: And at the conclusion of the

1 investigation, when the report goes public, the transcripts  
2 are put in the PDR and you can get a copy at that time.

3 MR. HAES: Okay.

4 MS. ULLRICH: Okay.

5 MR. HAES: Sure.

6 MS. ULLRICH: All right, then what we want to  
7 start out with is just going back to August to the time  
8 just prior to when you became aware of the incident and  
9 tell us how you became aware of the incident and what you  
10 know of the sequence of events after that.

11 MR. HAES: Up until when?

12 MS. ULLRICH: Up until now. I mean, what were  
13 you -- what did you know, what were you involved with, what  
14 kinds of things did you do as part of that event?

15 MR. HAES: On August 19th, the Saturday  
16 evening, I received a call approximately 5:30 or  
17 thereabouts in the evening from Tom Lynch, who was the on  
18 call EMS person. Tom informed me that there was a  
19 researcher who had called in to the EMS emergency number or  
20 the MIT emergency number. And apparently the person was  
21 contaminated, and they had taken readings of this  
22 particular individual, and it was believed that the  
23 contamination involved his entire body, and they didn't  
24 know what to do at that point.

25 So I asked him, you know, what type of meter

1 they were using. I asked him to -- you know, was it  
2 involving the hands or was it involving other portions of  
3 the body. And they said -- and Tom replied that it seemed  
4 to be coming from the entire body. Then I -- excuse me.  
5 So I asked him for a number to contact. He said that he  
6 tried to contact Mitch, and there was a phone call in to  
7 him and Mitch would be getting back to him.

8 And at that time, I did contact -- I believe it  
9 was the physician at the medical --

10 MS. ULLRICH: Okay.

11 MR. HAES: -- facility and spoke with the  
12 physician. And he reiterated the contamination appeared to  
13 be spread throughout the body, didn't seem to be removable  
14 on any portion of the body either with wiping -- you know,  
15 particularly through wiping. And I asked if there was a  
16 possibility he may have ingested something, and that was a  
17 possibility. So I suggested that he start rinsing off his  
18 mouth with a saline solution, and then the save the  
19 washings in a separate bin so we could analyze to see if  
20 anything was coming from his mouth.

21 And that also we should obtain a urine specimen  
22 from the researcher, and that I would be on my way in. At  
23 that point, I made preparations to come in. I arrived at  
24 approximately 7:00 or thereabouts. I don't know the exact  
25 time. In which case, -- I believe I arrived right behind

1 Mitch. Mitch had also come in.

2 He had been there maybe two or three minutes  
3 before I was. We met in the decommissioning -- not  
4 decommissioning, decontamination facility. Met with the  
5 researcher. We took some readings to verify that it was in  
6 fact -- the contamination appeared to be throughout the  
7 entire body. We also obtained a urine specimen from the  
8 researcher. And the physician had also taken a blood  
9 sample, so we obtained the blood sample.

10 We also obtained a sample of the rinsings that  
11 he had from his mouth. I verified through towels that  
12 nothing was removable on his body. We asked him some  
13 questions -- you know, what have you been doing this  
14 evening, how did you find it. He explained that he found  
15 it by looking at his -- monitoring his hands and there  
16 seemed to be a high background on his hands.

17 Then when he checked himself, it seemed to be -  
18 - you know, throughout his chest area. And we in fact  
19 found it, you know, spread out throughout his entire body.  
20 It was reading higher in the mouth. Besides the mouth, the  
21 forehead was the next highest level that we found. We had  
22 determined since he was -- that there was internal  
23 contamination, not an external contamination, that it would  
24 be best to come back to the laboratory, this portion here,  
25 to examine him then.

1                   On the way over, Eugene had indicated to me  
2   that he had already been in the process of counting urine  
3   specimens.

4                   MS. ULLRICH: Okay.

5                   MR. HAES: And that he was unsure of what the  
6   numbers meant. And I asked him what kind of numbers he had  
7   obtained. He said he had obtained roughly 2,000 counts per  
8   minute or 2,000 dpm's. And I remember specifically him  
9   asking me for the conversion from dpm's to microcuries, so  
10   I did provide that conversion for him. When we got back,  
11   we counted the urine specimen, and it was in fact 8,000  
12   dpm. And Mitch then explained to him that he probably had  
13   in inaccurate number because he didn't count up all three  
14   of the windows set on -- typically set on the Cancer  
15   Center, Department of Biology Department liquid  
16   scintillation counters.

17                   At that point, Mitch ran -- reran the urine  
18   specimen. We also ran the blood sample. Then we also did  
19   a complete mapping of the body. We looked at dose rates  
20   from the top of his head, the back of his head, from his  
21   mouth, from his forehead, from his neck, from the  
22   shoulders, and then I suggested that we look at all the --  
23   since it seemed to be in the bones, that -- you know, and  
24   understanding that P-32 does go to the bones after awhile,  
25   we checked the knees, the elbows, the shins and so on.



1           And we mapped that out and we recorded that on  
2 a piece of paper. We also asked him to describe one more  
3 time how he thinks this may have happened.

4           MS. ULLRICH: Okay.

5           MR. HAES: And where it may have gone -- or  
6 where it may have come from and when it may have happened.  
7 And he indicated that the last time he worked with  
8 radioactive material was on Monday the 14th. He explained  
9 that he performed a process in the morning and then had  
10 lunch, repeated the process in the afternoon. And we asked  
11 him if -- did he check himself after every time he had  
12 worked, and he said yes, he did, and there was no  
13 contamination at that particular time.

14           Then he stays there or did some work outside of  
15 the laboratory, had his evening meal around 8:00 from what  
16 I can remember his saying. And that he went home. And  
17 that was the last time that he had worked with radioactive  
18 materials. Thinking that there was a possibility he may  
19 have ingested the material, seeing as though there were  
20 higher readings in the mouth than anywhere else in the  
21 body, you know, I was wondering well, was it in the teeth  
22 or what.

23           So we figured he must have ingested something,  
24 because he doesn't remember ever having a pinprick or --  
25 you know, I asked him if he had been, you know, stabbed

1 with a needle any time, and he said no, he hadn't, he  
2 didn't work with needles. And it's highly unlikely that he  
3 had breathed anything in because it's difficult to  
4 devolatilize that much material to where you'd be getting  
5 8,000 dpm in the urine specimen.

6 We then surveyed the laboratories. We looked  
7 into the refrigerator where he had eaten the -- or where he  
8 had obtained his evening meals from. We looked in the  
9 laboratory's -- I personally surveyed all the refrigerators  
10 in the area. We surveyed the conference room, all  
11 unrestricted areas close to his facility. We also surveyed  
12 all the laboratories.

13 I made particular mention of the waste  
14 containers -- looking around the waste containers. We also  
15 looked where he was working. We surveyed the area, found  
16 no contamination --

17 MS. ULLRICH: Okay.

18 MR. HAES: -- in the area that he was working.  
19 And at that point, I believe we informed him that we would  
20 like him to save all of his urine or to give us urine  
21 specimens every time he urinates until we meet back with  
22 him on Monday. And he said that he would do that. We said  
23 we wanted the -- a sample of the urine plus the volume of  
24 the urine that he excreted. And I believe we provided  
25 him containers for that.

1           As a matter of fact, I think it was the same  
2 containers that the saline solution was in. So we provided  
3 those for him, and that was about the event of that  
4 particular Saturday evening. I believe I finished up  
5 around 11:00 at night.

6           MS. ULLRICH: Okay.

7           MR. HAES: 10:00, 11:00, somewhere in there.  
8 On Monday, we met again with the researcher. I asked him  
9 some specific questions. We had asked him on that Saturday  
10 if he was mouth pipetting. He insists that he was not. We  
11 asked him some further questions -- reiterate again what he  
12 had done with the material, where he thinks it may have  
13 come from.

14           We obtained his urine specimens, ran some  
15 samples through the liquid scintillation counting. At that  
16 particular time, we also obtained urine -- thinking that it  
17 may have been from a common source, we obtained urine  
18 specimens from as many researchers as we could find. We  
19 went through Dennis King for that. I believe there was 16  
20 samples we obtained that particular day. 16 -- I really  
21 can't remember the exact number.

22           Those were -- we ran those. Those were all  
23 negative. At that point, I contacted Steve Greenlaw, the  
24 radioactive waste technician. I suggested to him that we  
25 hold all radioactive waste and bring that down into our

1 facility in 6019 and hold that for inspection. So we held  
2 all the waste that particular night.

3 We also spoke with members of the laboratory  
4 asking them their particular -- what they had worked with  
5 at the time. And I don't believe any other work with P-32  
6 was going on at that particular time, with the exception of  
7 Eugene Li. And he had indicated that he had worked with no  
8 more than 50 microcuries at that particular time on that  
9 Monday.

10 MS. ULLRICH: Okay.

11 MR. HAES: Monday the 14th I'm talking about.

12 MS. ULLRICH: Sure.

13 MR. HAES: Let's see. From then on, Eugene --  
14 I can't remember if it was Monday or Tuesday, he came in  
15 and presented -- it might have been Monday. He came in and  
16 presented proceedings of ICRP-30 and showed us a curve and  
17 was asking if we could relate the urine concentrations we  
18 had obtained from his urine with these particular retention  
19 values and how that would stand relative to the limit of  
20 intake.

21 We indicated that we would take it under  
22 advisement. We would look at that, however Mitch was  
23 already working on a couple of other methods. He was  
24 working on -- you know, following the recommendations of  
25 the NUREG. And also he was looking at calibrating the

1 whole body counter.

2 Just to back up a little bit, he had also taken  
3 a whole body count on that Saturday night, --

4 MS. ULLRICH: Okay.

5 MR. HAES: -- but that's what Mitch was  
6 involved in. My involvement -- I saw my particular role at  
7 the time was to look at the laboratory since I was familiar  
8 with all the work in the laboratory and most familiar with  
9 the workers since that's part of my responsibility. I was  
10 focusing on trying to find the source, if in fact it was a  
11 common source or a specific source.

12 I was looking at that. And then Mitch  
13 suggested to me that I start -- I perform a follow up on  
14 attempting to use the proceedings of the ICRP-30 which  
15 Eugene had asked us to look at. I started to plot day by  
16 day the results of our urine counts versus the numbers on  
17 the ICRP-30. The problem was they gave you data points for  
18 days three, seven, 30, and 60.

19 And Eugene had drawn -- or extrapolated between  
20 the points and provided us a day by day print out of the  
21 numbers. We started to use those values. I started to use  
22 those values and realized that the number was rising almost  
23 exponentially. I mean, it was getting larger and larger as  
24 the days went out. Looking at that further, I plotted that  
25 on the computer and realized that he had made an improper

1 interpolation between points which would drive the results  
2 he was looking for way up.

3 So at that point, I performed the proper  
4 interpolation between the points and continued to use the  
5 proceedings of ICRP-30, the evaluation protocol, in looking  
6 at that. Now, that protocol basically was an outline which  
7 was an investigation level for, I believe, 1/20th of an  
8 ALI.

9 MS. ULLRICH: Okay.

10 MR. HAES: Is what that document was doing. So  
11 by applying that, we could get some rough estimates of what  
12 the intake was. Eugene, however, was suggesting that this  
13 is what we do to do the evaluation on his particular  
14 intake, and of course we had other methods available to us  
15 to do that. So from that point, my involvement was dealing  
16 with the laboratory, talking with Dennis King, trying to  
17 identify the source, setting up surveys.

18 I performed surveys weekly at the particular  
19 laboratory from then on looking in there. On Tuesday, we  
20 met with the Tonegawa lab, and I believe Frank and I --  
21 Frank Masse and I had a discussion on Monday about, you  
22 know, removing all radioactive material from the  
23 laboratories.

24 And the decision was made at that point to  
25 remove that. And on Tuesday, I removed all the materials



1 from the laboratory. We kept that in storage in our  
2 particular freezer. And for the next -- I believe it was  
3 nine or so days, no more work was involved in the  
4 laboratories involving radioactive materials.

5 We met with the --

6 MS. ULLRICH: Just in Tonegawa's lab?

7 MR. HAES: Tonegawa's lab, yes.

8 MS. ULLRICH: Okay.

9 MR. HAES: I also -- I believe it was on  
10 Tuesday I also spoke with other members of labs on the  
11 third floor indicating to them that there was a  
12 contamination incident and they should perform surveys in  
13 their area, you know, of themselves and also the area they  
14 were working in to make sure that the contamination wasn't  
15 spread beyond that.

16 What I was doing there is I was, you know,  
17 having them do personal contamination investigation to see  
18 if there was in fact a common source that we hadn't  
19 identified yet. Those were negative from what I  
20 understand. I also spoke with members on the fifth floor,  
21 the second floor and the first floor of E17, again  
22 reiterating what was going on at the time, that there was a  
23 contamination incident and that's all I referred to it as.

24 The fourth floor, there was only one lab that  
25 works with the radioactive material on the fourth floor,

1 and they really haven't done much in the last year or so,  
2 so I left them out. Continuing on, the investigation --  
3 it was a day by day evaluation of what the numbers we were  
4 getting -- where they stood.

5 I was plotting them to see how it was tracking.  
6 I was plotting the numbers from -- that Mitch was  
7 generating on NUREG. I was also plotting the numbers he  
8 was generating on -- from the whole body counter, and I was  
9 also plotting my numbers with the proceedings of the ICRP-  
10 30.

11 MS. ULLRICH: Okay, do you remember the name or  
12 the number of the NUREG that Mitch was using?

13 MR. HAES: 4884 I believe it was.

14 MS. ULLRICH: Okay, all right.

15 MR. HAES: It's in his desk.

16 MS. ULLRICH: The big blue --

17 MR. HAES: The big blue one, yes.

18 MS. ULLRICH: Okay.

19 MR. HAES: Interpretation of bioassay data and  
20 measurement I believe is the name of it. CR-484 or  
21 something like that.

22 MS. ULLRICH: Okay.

23 MR. HAES: So I was in the process of data  
24 comparison, if you will, looking at that plotting and  
25 seeing if it makes sense, seeing if it's following the way

1 we would expect it to. I was also plotting it was air bars  
2 and seeing how that -- seeing how everything tracks out.

3 We had also asked Dennis King to -- when we  
4 collected the material on Tuesday, is to perform a  
5 inventory in use document for us that would indicate how  
6 much -- of P-32 had been used and what the disposition was.  
7 I believe by Thursday we had that particular amount, and I  
8 believe it was 50 microliters or something like that, which  
9 worked out to around 500 or so microcuries was missing.

10 It was interesting to me that it was -- that it  
11 appeared to be missing from one particular vial. And that  
12 was a vial that was dated and delivered on Monday the 14th.  
13 So it seemed to me that there was indication that the --  
14 and that was about how much we were looking at as far as  
15 the ingestion based on the whole body counts and the NUREG  
16 counts.

17 At this point, the ICRP-30 was not tracking  
18 properly at all

19 MS. ULLRICH: Okay.

20 MR. HAES: But I continued to plot those  
21 numbers to see where things were going.

22 MS. ULLRICH: Do you still have those plots?

23 MR. HAES: Yes.

24 MS. ULLRICH: Okay.

25 MR. MADISON: Have you provided those already

1 to us?

2 MR. HAES: I don't believe anybody asked for  
3 those.

4 MR. MADISON: We'd like to request those.  
5 We'll recap documents at the end of the interview if  
6 there's anything we want to request.

7 MR. HAES: Yeah, sure. Write those down. We  
8 can provide that. Let's see, --

9 MS. ULLRICH: You said that the vial was dated  
10 and delivered for Monday.

11 MR. HAES: On the 14th.

12 MS. ULLRICH: Could you just explain what you  
13 mean by that?

14 MR. HAES: The vial that Dennis King had  
15 indicated had around -- maybe it was -- no, maybe it was --  
16 I think 467 microcuries was missing from that particular  
17 vial.

18 MS. ULLRICH: Okay.

19 MR. HAES: And there was 500 total, but that  
20 included other vials which you could account for residual  
21 on the side of the V vial or whatever. But I believe it  
22 was 467 I think was the number. I had it written down in  
23 the report.

24 MS. ULLRICH: Yeah. What do you mean by dated  
25 and delivered on that Monday?

1 MR. HAES: It was received by the laboratory on  
2 the 14th of August.

3 MS. ULLRICH: Okay, all right.

4 MR. HAES: So speaking with Dennis, we thought  
5 that it was possible that's where the material came from.  
6 At that point, I started to investigate all of the waste  
7 that was collected from the laboratory. I went through  
8 every single bag of waste that they had, looking for  
9 anything out of the ordinary, you know, food items.

10 MS. ULLRICH: Do you know what period of use  
11 the waste represented? You said you picked it up on  
12 Monday, when your --

13 MR. HAES: Yeah, I believe the period of  
14 waste -- we would have the records of what that is. I  
15 don't know in particular, but I believe it would be from  
16 say Wednesday or Thursday until the following Tuesday when  
17 it was picked up. But we would have all those records on  
18 file.

19 MS. ULLRICH: Okay.

20 MR. HAES: So I went through the waste, and I  
21 found nothing out of the ordinary. Then I found -- in the  
22 back of my mind, I was looking for that vial in particular.  
23 I found a waste container that had maybe 300 vials in it,  
24 and so I painstakingly, with a pair of tongs, looked  
25 through, and I did find the vials which -- I found the vial

1 that was used on the 14th and the outer container.

2 So I saved those -- put those aside. And I  
3 handled them with tongs, and we put those aside and we  
4 still have those.

5 MS. ULLRICH: Okay.

6 MR. HAES: At that point, again my involvement  
7 continued to be to work with Mitch.

8 MS. ULLRICH: Okay.

9 MR. HAES: And you know, taking the numbers  
10 that he was generating and plotting those and seeing how  
11 things work out -- just you know, consulting with Mitch  
12 about, you know, what avenues we should do, what the  
13 numbers -- you know, how they -- what we'd expect.

14 And at that point, the following week, Eugene  
15 started to become somewhat adversarial with us. But we --  
16 you know, we still maintained our, you know, objective  
17 opinion of what was going on. I think it was on the  
18 Thursday --on that Thursday of the week after it happened,  
19 I asked him specifically if he had taken it intentionally  
20 from a standpoint that I felt the question had to be asked  
21 just to have it on record that, you know, he indicated that  
22 he had not.

23 MS. ULLRICH: Is that Thursday, the week of the  
24 19th, or Thursday the following week?

25 MR. HAES: Let's see, --



1 MS. ULLRICH: The 19th was the Saturday --

2 MR. HAES: -- the 19th was Saturday. This  
3 would have been the week of -- Thursday the week of the  
4 20th, Sunday being the first day.

5 MS. ULLRICH: Okay, so like the 24th, 25th,  
6 something like that?

7 MR. HAES: Right.

8 MS. ULLRICH: Okay.

9 MR. HAES: So that was really -- that's really  
10 been my involvement since then was analyzing samples in  
11 Mitch's absence, collecting the urine, making sure that the  
12 integrity of the urine specimens were maintained. We --  
13 after a while, we had about 30 gallons of urine in the  
14 laboratory, so we decided that we had to save  
15 representative samples.

16 I mean, this individual is roughly two or two  
17 and a half times reference man in his excretion function,  
18 so we started to save representative samplings. I also  
19 made sure that we maintained integrity of all the samples  
20 we have obtained in the LSC vials. We had all those data  
21 labeled. And that was basically my -- and that's been my  
22 involvement since then.

23 MS. ULLRICH: Okay.

24 MR. HAES: Is basically data processing and so  
25 on.

1 MS. ULLRICH: Okay. I just want to verify a  
2 couple of things. You arrived on Saturday night after you  
3 got the call from EMS?

4 MR. HAES: Correct.

5 MS. ULLRICH: And you went to the medical  
6 center to meet with Li?

7 MR. HAES: Correct.

8 MS. ULLRICH: You then went from the medical  
9 center to here, and then from here to his laboratory?

10 MR. HAES: I don't -- I would say looking --  
11 you know, thinking back of -- I would have to look at the  
12 time of the counting. I believe the time of the counting  
13 was later, so we may have looked at the laboratories first.  
14 You know, I think we looked in the laboratories first, come  
15 to think of it.

16 MS. ULLRICH: Okay.

17 MR. HAES: You know, I do, you know, hundreds  
18 of surveys a month, so these all start to blend, you know,  
19 after a while. So I believe that we would have -- that we  
20 looked there first and then came back.

21 MS. ULLRICH: Okay, okay.

22 MR. HAES: But again, I can verify that with  
23 the time of counting the urine specimen.

24 MS. ULLRICH: Okay, we can -- we have the urine  
25 data, so I think --

1 MR. HAES: Yes, I have copies of that also.

2 MS. ULLRICH: Okay. Now you say you do a lot  
3 of surveys and that you have responsibility for that  
4 laboratory or that building. Could you just elaborate on  
5 that? What is your responsibility there?

6 MR. HAES: Okay, my responsibility -- in our  
7 particular laboratory, we have -- in our office, we grant  
8 authorizations through the radiation protection committee  
9 to use and possess radioactive materials. Mitch being the  
10 associate divides up authorizations by groups to individual  
11 assistant radiation safety officers.

12 I am the assistant radiation safety officer in  
13 charge of the authorizations in the cancer center.

14 MS. ULLRICH: Okay.

15 MR. HAES: So my involvement in this would be  
16 to have the oversight of the authorization to use and  
17 possess radioactive materials for the radiation protection  
18 office, who answers to the radiation protection committee.

19 MS. ULLRICH: Okay.

20 MR. HAES: So that's my involvement.

21 MS. ULLRICH: Okay. And do you also then have  
22 responsibility to do surveys over there?

23 MR. HAES: I do spot checks on many  
24 laboratories every single week. I don't necessarily record  
25 results. What I'm doing is I'm making my presence known in

1 the Cancer Center, make sure the people know who I am,  
2 looking things through. I'm also -- you know, that's part  
3 of our supervisory protocols for our technicians is to see  
4 how our technicians are doing.

5 So I spot check, you know, how they're doing.  
6 Sometimes I carry a meter over there, sometimes I don't.  
7 Mostly what I'm doing is I'm observing the laboratories and  
8 looking for trends like lack of housekeeping, the use of  
9 lab coats, the use of gloves, evidence of eating and  
10 drinking in the laboratories and so on.

11 MS. ULLRICH: Okay.

12 MR. HAES: From the -- when this lab first  
13 started back up using radioactive materials, I started  
14 doing weekly surveys over there.

15 MS. ULLRICH: Okay.

16 MR. HAES: And those surveys were in fact  
17 documented.

18 MS. ULLRICH: Okay.

19 MR. HAES: And that was a request of Frank  
20 Masse that we start looking over there weekly.

21 MR. MADISON: Was anything being done similar  
22 to that prior to the event by anybody, a weekly survey?

23 MR. HAES: We divide our laboratories up into  
24 weekly, monthly, and quarterly surveys based on the amount  
25 of activity -- radioactivity used in the laboratory and the

1 activity. In other words, how often they use it. Every  
2 authorization has at least one weekly survey regardless of  
3 how much radioactivity they use.

4 In conjunction with that, one lab -- they have  
5 a number of other weekly surveys and also monthly surveys.

6 MR. MADISON: Are those all recorded?

7 MR. HAES: Yes, those are all recorded. So  
8 this particular laboratory, I believe he's got -- I don't  
9 know exactly, but he's got more than one weekly laboratory  
10 that we go over there on a weekly basis. And every time I  
11 go in that building, I do visit his laboratory just because  
12 that's probably the most active group there. And the third  
13 floor certainly has the most use of all the Cancer Center.

14 MS. ULLRICH: Do you assign specific  
15 technicians to that building, or is it random?

16 MR. HAES: Yes.

17 MS. ULLRICH: Okay.

18 MR. HAES: There is a specific technician  
19 assigned to that building.

20 MS. ULLRICH: Who would that be?

21 MR. HAES: Geoffrey Sirr, G-E-O-F-F-R-E-Y S-I-  
22 R-R.

23 MS. ULLRICH: Okay. Do you know when he had  
24 most recently been through there prior to this incident?

25 MR. HAES: No, I do not.

1 MS. ULLRICH: Okay.

2 MR. HAES: Since the surveys are weekly, it had  
3 to have been that particular week. But what day of the  
4 week it was, I don't know what days he was over there.

5 MS. ULLRICH: Sure. Okay. Regarding the  
6 authorizations, who is or are the authorized users over in  
7 the laboratory? How is that organized here?

8 MR. HAES: They have -- the principal  
9 investigator -- in this case, Sumumu Tonegawa -- has the  
10 responsibility of notifying the radiation protection office  
11 of all prospective users of radioactive materials. The  
12 process to be a registered radioactive materials user is to  
13 contact our office, obtain a date for training.

14 Once the person is trained, we put them on the  
15 authorization list and provide any necessary dosimetry.  
16 And once they are trained, they are authorized to use  
17 radioactive materials. Prior to that, they are not  
18 authorized to do so. We maintain records in the  
19 authorization. What happens is when we write up an  
20 authorization, we have a list of users.

21 At that point, any new users are added. And  
22 Pam usually -- if we're notified that a person has left,  
23 the person is crossed off the list and the -- or if they're  
24 transferred laboratory or left the institute, they're  
25 crossed off the list. And the RP 50 form, which is the



1 registration form, is filed in our termination files.

2 Every two years when the authorization is  
3 renewed, we get a list of people from the principal  
4 investigator. I provide them with the old list, including  
5 all the added names. The principal investigator compares  
6 those, makes any corrections, provides a new list to us.  
7 When we get that list back, we compare that list versus the  
8 old list.

9 And if there are any people appearing on the  
10 list, we indicate to the PI that these people are not  
11 trained and they are not to use radioactive materials until  
12 they are trained. And a lot of times, we get prospective  
13 users. These people will use material some day, but  
14 they're not using it right now.

15 And any people who are not -- who were on the  
16 list who are not on the new list, we go ahead and terminate  
17 those people and -- we don't terminate the people, we  
18 terminate the forms.

19 MS. ULLRICH: Sure.

20 MR. HAES: And put those in file. So I believe  
21 there are 30 some odd researchers right now in the  
22 laboratories.

23 MS. ULLRICH: And they are all listed on  
24 Tonegawa's authorization form?

25 MR. HAES: Yes, yes.

1 MS. ULLRICH: Okay, they do not have their own  
2 authorization forms?

3 MR. HAES: No, no.

4 MS. ULLRICH: Okay.

5 MR. HAES: No, the authorization form -- I  
6 assume you mean the RP 01 form?

7 MS. ULLRICH: Yes.

8 MR. HAES: That is the actual authorization.

9 MS. ULLRICH: Yes.

10 MR. HAES: The RP 50 is the registration of a  
11 user form.

12 MS. ULLRICH: Okay. Which of those forms does  
13 the radiation protection committee review and approve?

14 MR. HAES: The RP 01.

15 MS. ULLRICH: That's for the principal  
16 investigator authorization of a laboratory?

17 MR. HAES: Correct. What they do is they  
18 outline their protocols, they outline how much they request  
19 as far as a possession limit, how much they're going to put  
20 in -- how much they'll have approximately per laboratory.  
21 When we get that, we put down any specific conditions of  
22 approval. For example, external dosimetry must be worn  
23 when using more than five millicuries or -- you know,  
24 something along that line, we'll add that.

25 We'll put in any requirements as far as thyroid

1   burden monitoring and so on.

2                   MS. ULLRICH: Okay. And that's the RP 50?

3                   MR. HAES: RP 01.

4                   MS. ULLRICH: RP 01, okay.

5                   MR. HAES: Right.

6                   MS. ULLRICH: How many laboratories are part of  
7 Dr. Tonegawa's "lab"? Because we've been referring to it  
8 as a singular lab group.

9                   MR. HAES: No, it's -- I don't know the exact  
10 number. It's like a maze back there. But there is six,  
11 seven or eight laboratories.

12                   MS. ULLRICH: Okay.

13                   MR. HAES: I have a record of how many there  
14 are.

15                   MS. ULLRICH: Okay, okay. We can look at that  
16 later.

17                   MR. MADISON: How many users total?

18                   MR. HAES: You mean authorized users or --

19                   MR. MADISON: Well, help me out here a little  
20 bit. The difference between an authorized user and end  
21 user, is there some supervisory relationship here?

22                   MR. HAES: There are a lot of people who are  
23 authorized to use radioactive materials who do not in fact  
24 use it. They were authorized, they used it once, they  
25 performed one experiment, or they want to be authorized

1 just in case. I don't know what their particular interests  
2 are, but they don't necessarily use it all the time. See  
3 what I mean?

4 So there may be 20 people in the laboratory who  
5 want to be authorized to use materials, but for whatever  
6 reason, they have not the need to do so. Therefore, they  
7 don't use it.

8 MS. ULLRICH: So I guess maybe to help Alan  
9 out, how many people are authorized to be allowed to use  
10 radioactive material, and what is your estimate of the  
11 number of people who actually are using material? You want  
12 to whole building or you want to just stick to Tonegawa's  
13 lab?

14 MR. MADISON: Well, we're charged with looking  
15 at the Cancer Center, so I want to --

16 MR. HAES: The entire -- it's got to be over --  
17 it's got to be -- I would say total number of users is  
18 probably around 150. I don't know exactly. I've never,  
19 you know, counted them. But it's got to be around 150  
20 based on the fact that there's I believe 11 authorizations  
21 to use and possess radioactive materials in the building,  
22 and the lab size runs anywhere between five to 30 people.

23 MR. MADISON: Okay.

24 MR. HAES: Some are large, some are --

25 MR. MADISON: And the authorized user, is that

1 like Dr. Tonegawa would be the authorized user and then  
2 those personnel that are -- these supervisors are end  
3 users? Would that be correct?

4 MR. HAES: I don't think we make any --

5 MR. MADISON: Distinction?

6 MR. HAES: -- distinction. We have people who  
7 are -- we have people who supervise the use of -- and  
8 that's the principal investigator. And then we have the  
9 people who are authorized to use material who are the  
10 registered workers. So we have principal investigators and  
11 registered workers.

12 MR. MADISON: Is there any associated  
13 responsibility with being a principal investigator?

14 MR. HAES: That's outlined in the required  
15 procedures, yes. Just like there's responsibilities of  
16 being a registered user. Those are outlines in the  
17 procedures also.

18 MR. MADISON: Okay.

19 MS. ULLRICH: And let's get the full scope of  
20 the organization nailed down then. We are charged with  
21 looking at the Cancer Center. You stated that you've never  
22 counted up the actual people in the Cancer Center.  
23 Although, I think you probably could have a fair idea of  
24 how many people are authorized on the campus.

25 How is your accountability for persons

1 organized here? Is it by building, or is it by RP 01? How  
2 would you do that assessment if you were trying to  
3 determine where people are located and how many you have  
4 where?

5 MR. HAES: We have a -- I have a list of all  
6 the authorizations that I'm responsible for.

7 MS. ULLRICH: Okay. That's the RP 01 form?

8 MR. HAES: The RP 01 forms. On those -- in all  
9 those documents are the lists -- current lists of  
10 authorized -- or registered radiation workers. And that's  
11 how I would add up everything. You know, all the people  
12 that are responsible -- that are under my responsibility as  
13 far as oversight.

14 MS. ULLRICH: Okay. And do you have any idea  
15 of how many authorizations you're responsible for?

16 MR. HAES: It changes so often.

17 MS. ULLRICH: Okay.

18 MR. HAES: Let's see.

19 MS. ULLRICH: More than 20? More than 50?

20 MR. HAES: Oh, yes, more than 20. Between 40  
21 and 50, somewhere around there.

22 MS. ULLRICH: Okay.

23 MR. HAES: I have the responsibility of sealed  
24 sources also. And there are a lot of sealed source  
25 authorizations that have perhaps one or two users.

1 MS. ULLRICH: Okay.

2 MR. HAES: That's why I have a lot, but there  
3 may not -- there may not be that much work.

4 MS. ULLRICH: Okay. You had been involved  
5 somewhat with the urinalysis of the individual?

6 MR. HAES: Yes.

7 MS. ULLRICH: Okay. I don't know if we've gone  
8 through this with anybody else. It doesn't really matter  
9 anyhow. I would like to know what you did with the urine  
10 samples, what instructions were given for collection, and  
11 then what started that? What instructions were given to  
12 him for collection of the sample?

13 MR. HAES: On that Saturday night, we had asked  
14 him to obtain representative -- obtain representative  
15 samples of his urine that he excreted. We wanted to have  
16 a good representative sample, plus we wanted to know the  
17 volume plus the date and the time of excretion. We  
18 analyzed those on -- I believe on Monday, for the remainder  
19 of Saturday, for Sunday, and also Monday when he came in.

20 MS. ULLRICH: Okay.

21 MR. HAES: We also whole body -- we've been  
22 whole body counting him every day since then, but I wasn't  
23 involved in that at all. I believe it became apparent on  
24 Thursday -- either Wednesday evening or Thursday, it became  
25 apparent -- this is the following week -- it became



1     apparent that he was confused on the times he would write  
2     for his excretion.

3             He would indicate -- you know, it got confusing  
4     to me that we had some overlapping times. And for example,  
5     he had two 600 mil samples that had the same time and date.  
6     And I found it hard to believe that a bladder could hold  
7     1.2 liters, considering that the Reg. handbook says that --  
8     I believe a bladder can contain 500 mils under distress.

9             So that would be extremely distressful to have  
10    1.2 liters. So it became apparent that there was some  
11    difficulty in his ability to collect and properly date the  
12    urine. We also had some missing. There was also some  
13    confusion on the times. He wasn't properly putting down  
14    the time. He would put down the time that he started the  
15    jug to sit there, but he wouldn't write down the time he  
16    actually excreted it.

17            So one jug may have been started at noon, but  
18    he didn't urinate until 3:00 in the afternoon, for example.  
19    I discussed this with Frank and with Mitch, and Frank  
20    talked to him I believe on Thursday and asked him to start  
21    collecting 24 hour urine. We wanted to collect all the  
22    urine that he had. And we gave him one liter bottles for  
23    that -- I'm sorry, one gallon bottles for that.

24            And we wanted the collection period to be from  
25    noon to noon which made it easier for us and also easier

1 for him. So I believe on that Friday is the first time  
2 that we actually obtained a good 24 hour urine, about noon  
3 to noon.

4 MS. ULLRICH: Okay.

5 MR. HAES: We had to make some assumptions in  
6 the previous periods of what constituted a noon to noon  
7 sample. And on that Wednesday and Thursday, we were  
8 analyzing some of the urine specimens, Dr. Li at this point  
9 was somewhat adversarial and was indicating that this  
10 particular amount of urine in this bottle would be  
11 considered -- or should be considered for the previous 24  
12 hour period and the following 24 hour period.

13 And I didn't think that you could urinate the  
14 same volume twice. So at that point, you know, we figure  
15 that the noon to noon would be the best way to do it. So  
16 that's when we started collecting the samples was noon to  
17 noon on I believe that Friday.

18 MS. ULLRICH: Okay. When you did have the  
19 sample then, what, if any, methods did you use to preserve  
20 or treat the sample?

21 MR. HAES: Well, we would write down -- make  
22 sure that the dates and times were correct. I also  
23 recorded the volume -- I recorded the volume by comparing  
24 it was a like container and filling that with a graduate  
25 cylinder up to the same line, recording the volume. We had

1 also removed two one mil samples, and using the protocols  
2 outlined in the Canberra manual, we performed a urinalysis  
3 on those particular samples with liquid scintillation  
4 counting.

5 MS. ULLRICH: Okay. Did you use any method of  
6 discolorization of the sample?

7 MR. HAES: No.

8 MS. ULLRICH: And did you do any distillation?

9 MR. HAES: No.

10 MS. ULLRICH: Okay. And added no chemical  
11 preservatives to any of the samples?

12 MR. HAES: No.

13 MS. ULLRICH: Okay. So they're all as they've  
14 been for two months at this point?

15 MR. HAES: That's correct.

16 MS. ULLRICH: Okay.

17 MR. HAES: In the hood.

18 MS. ULLRICH: Okay, so you said you took two  
19 one mil aliquots --

20 MR. HAES: That's correct.

21 MS. ULLRICH: -- from the sample and counted  
22 them. What did you mix them with for counting?

23 MR. HAES: Following procedures in the Canberra  
24 -- as outlined at Canberra manual there, we put 20 -- I  
25 believe it was 20 mils of scintillation fluid in the vial,

1 added one mil, 1.00 mils with a pipetter of the sample into  
2 the liquid scintillation vial, shook it vigorously and  
3 labeled the vial and then let that settle, and then counted  
4 that on protocol eight, I believe it was -- protocol eight  
5 we counted that for --

6 MS. ULLRICH: Protocol eight in the Canberra  
7 manual?

8 MR. HAES: Yes.

9 MS. ULLRICH: And this is a Canberra counter?

10 MR. HAES: We used the same counter. It's the  
11 first one on the right as we --

12 MS. ULLRICH: Okay, we can get that  
13 information. I know we're asking for that information on  
14 another form.

15 MR. HAES: Okay.

16 MS. ULLRICH: So we'll get that. Do you  
17 remember what cocktail you used?

18 MR. HAES: The same one that's sitting in the  
19 laboratory on the bench.

20 MS. ULLRICH: Okay.

21 MR. HAES: That's all we ever used.

22 MS. ULLRICH: We'll get that from you then  
23 also. How long did you count for?

24 MR. HAES: I don't -- I believe it was two  
25 minutes. Whatever was set up in the protocol, that's what

1 I went for.

2 MS. ULLRICH: Okay, all right.

3 MR. HAES: Again, the number of samples that I  
4 ran was minimal. It was actually in Mitch's absence --

5 MS. ULLRICH: Okay.

6 MR. HAES: -- when he wasn't in. And the  
7 protocol was already set up. The protocol sets the time  
8 already automatically.

9 MS. ULLRICH: Okay. Does the protocol also set  
10 the window?

11 MR. HAES: Yes.

12 MS. ULLRICH: Okay. And that was the Canberra  
13 protocol eight?

14 MR. HAES: Right, direct DPM, I believe it's  
15 called.

16 MS. ULLRICH: Okay, okay. Oh, going back to  
17 the vial, you went through a lot of trouble to look for the  
18 vial and recover the vial from August 14th?

19 MR. HAES: Yes.

20 MS. ULLRICH: Did you do anything with that  
21 vial? Did you assay -- make any attempt to assay what  
22 might have been retained in the vial?

23 MR. HAES: No.

24 MS. ULLRICH: Okay.

25 MR. HAES: I said I wanted to handle it as

1 little as possible.

2 MS. ULLRICH: But you do still have the vial?

3 MR. HAES: Yes.

4 MS. ULLRICH: Okay.

5 MR. MADISON: Who has the vial?

6 MR. HAES: I do. It's in our hood. When I  
7 discovered it, I also contacted the campus police, who were  
8 at that time investigating to let them know that we did  
9 have the vial, and they said they could -- we could hold  
10 that for them.

11 MS. ULLRICH: And you found the vial in a  
12 container with other vials?

13 MR. HAES: Yes.

14 MS. ULLRICH: Is this a typical collection  
15 container that they maintain in the laboratory?

16 MR. HAES: It appeared as though they were  
17 using this particular container to store all their vials.  
18 So in other words, this would have been the usual place to  
19 throw away the -- to throw the vial in. I'm sure that they  
20 had -- this particular container was behind some sort of a  
21 place that had some shielding or in a place where nobody  
22 was sitting next to the -- a lot of laboratories will  
23 designate certain containers for certain uses based on the  
24 occupancy near the container.

25 MS. ULLRICH: Okay.

1                   MR. MADISON: But the rest of those vials were  
2 not saved, is that correct?

3                   MR. HAES: That's correct. I saved two. I  
4 believe I saved the vials dated the 14th, and there might  
5 have even been a vial dated the 19th. I'm not too sure  
6 what the second one is.

7                   MR. MADISON: And you have that second vial as  
8 well?

9                   MR. HAES: Yes, yes.

10                  MS. ULLRICH: Okay. And what you have or what  
11 you found was the glass inner vial in its lead pig with the  
12 blue outer cover?

13                  MR. HAES: I found the plastic inner vial  
14 complete with cover, and I also located the blue outer pig.

15                  MS. ULLRICH: Okay.

16                  MR. HAES: They were not together.

17                  MS. ULLRICH: They were not together?

18                  MR. HAES: They were separate.

19                  MS. ULLRICH: Okay. All right, now you say you  
20 were generally wandering through the laboratories a few  
21 times a week or at least once a week over in Tonegawa's  
22 area. What are the typical problems you find in the  
23 laboratories?

24                  MR. HAES: I don't think there are any -- you  
25 know, many times I go through I don't find any problems.



1 MS. ULLRICH: Okay.

2 MR. HAES: You know, I'm not too sure, you  
3 know, how I could answer what the typical problem was.  
4 They seemed to fall in the categories of, you know, an  
5 occasional evidence of eating and drinking. For example,  
6 if I find somebody has a coffee cup sitting on a counter  
7 turned upside down, I indicate that that's evidence of  
8 eating and drinking shouldn't be in there.

9 Whether it's used or not, you know, regardless,  
10 it shouldn't be in there. Occasionally you'll see somebody  
11 working with material or you know working with a pair of  
12 gloves on but have their lab coat sleeves rolled up or  
13 something like that. So I tell them to roll their lab coat  
14 sleeves down.

15 MS. ULLRICH: Okay.

16 MR. HAES: Nothing that would -- nothing really  
17 major. You know, more or less I just want to make sure  
18 that we have a presence in the laboratory.

19 MS. ULLRICH: Okay. Do you review the  
20 technician's results when they go out and do their surveys?

21 MR. HAES: Yes, I do.

22 MS. ULLRICH: What are the typical radiation  
23 levels or contamination levels that they're finding?

24 MR. HAES: They don't -- we haven't found that  
25 many contamination levels on floors. Very infrequently do

1 we ever find any on floors. The contamination levels we  
2 find on benches are within a couple of inches of spots. We  
3 may find spots that read .3 to one or so mr per hour. And  
4 the technician indicates on the form that he asked somebody  
5 in the laboratory to clean it up.

6 It's usually on -- it's usually behind a bench  
7 shield on a piece of bench paper or something like that  
8 that's easily changed or discarded.

9 MS. ULLRICH: Okay.

10 MR. HAES: Occasionally you'll find a microfuge  
11 or centrifuge that has some contamination. We just ask  
12 them to decontaminate that as much as possible.

13 MS. ULLRICH: Okay.

14 MR. HAES: That's about it.

15 MS. ULLRICH: My understanding or my  
16 recollection is that Tonegawa's lab was on probation a few  
17 years ago. Do you recall that?

18 MR. HAES: Yes, they were on probation about a  
19 year ago, I believe, for inadequate waste disposal records.

20 MS. ULLRICH: Okay. And inadequate in what way?

21 MR. HAES: They weren't properly filling out  
22 records of what they had disposed of.

23 MS. ULLRICH: Okay. Were you involved at all  
24 in reviewing the inventory that they did over at that  
25 laboratory to assess what activity they had used during

1 those previous couple of weeks?

2 MR. HAEG: I verified the records that Dennis  
3 King provided to me of what he had taken in was in fact  
4 what we had delivered.

5 MS. ULLRICH: Okay.

6 MR. HAES: So I did verify his intake was  
7 correct and what our records indicated was delivered to his  
8 laboratory.

9 MS. ULLRICH: Okay.

10 MR. HAES: I looked over his final numbers. I  
11 checked on his math, his subtraction, and decay correction.  
12 It seemed to be accurate.

13 MS. ULLRICH: Do you know how they came up with  
14 their numbers from the laboratory while they assessed what  
15 people had been --

16 MR. HAES: Dennis King told me that he looked  
17 into the laboratory notebooks of all uses.

18 MS. ULLRICH: Okay. And do they record what  
19 they take in the notebooks?

20 MR. HAES: As far as I know, yes.

21 MS. ULLRICH: Okay, all right. A couple of  
22 other things. That evening that Dr. Li discovered that he  
23 was contaminated, he had taken a sample himself and checked  
24 it.

25 MR. HAES: That's what he told me.

1 MS. ULLRICH: Yeah. Do you know if the counter  
2 he used -- did you go back and look at the counter he used  
3 at all to verify how it was calibrated?

4 MR. HAES: No, no. I had no interest in what  
5 he was doing with his urine specimens.

6 MS. ULLRICH: Okay, all right. Do you have any  
7 idea what the uncertainties are in the counts you got from  
8 your liquid scintillation counter? Is there any way that  
9 this counter gives you an error bar or a sigma uncertainty?

10 MR. HAES: Yes, it does. And I believe on one  
11 of the columns it gives you what the uncertainty is. But  
12 you know, again, you'll have to talk --

13 MS. ULLRICH: Okay.

14 MR. HAES: That's up to Mitch to do.

15 MS. ULLRICH: Okay. Do you have written urine  
16 collection protocol?

17 MR. HAES: Urine collection protocol?

18 MS. ULLRICH: Yeah.

19 MR. HAES: Not that I'm aware of.

20 MS. ULLRICH: Okay. So you -- when you asked  
21 Dr. Li for a sample from each void initially, this was  
22 based on past experience, or how did you come up with that  
23 as a sampling collection period?

24 MR. HAES: Well, it just made sense to me that  
25 if you're looking to see what's in -- you know, what's in

1 the urine, what you do is you void into a container without  
2 overflowing the container, and you write down, you know,  
3 the volume of what you had voided.

4 MS. ULLRICH: Okay.

5 MR. HAES: And we gave him containers that were  
6 -- again, as I said before, those saline containers had  
7 some graduations for volumes and also record the date and  
8 time.

9 MS. ULLRICH: Do you think there was any  
10 potential for cross contamination from sample to sample as  
11 it was collected? In other words, if he used the same  
12 container for the initial measurement of volume each time,  
13 would he have had to do that?

14 MR. HAES: I don't -- you'd have to ask him how  
15 he took his -- you know, I did not want exactly how he --  
16 we wanted all the urine collected.

17 MS. ULLRICH: Okay, okay.

18 MR. HAES: Or samples collected.

19 MS. ULLRICH: Okay. Are you involved at all  
20 with any of the quality assurance or quality control  
21 procedures for the radiation protection laboratory  
22 instrumentation?

23 MR. HAES: No.

24 MS. ULLRICH: No? Okay. Oh, have the samples  
25 been refrigerated since the time of the collection?

1 MS. ULLRICH: Okay. How often is no one  
2 working in the laboratory? Are they -- I get the  
3 impression from some of the post doc's that they're there  
4 sometimes 12, 14, 16 hours a day and frequently more than  
5 Monday through Friday.

6 MR. HAES: Yes, yes. Some of the laboratories  
7 are used quite often.

8 MS. ULLRICH: Okay.

9 MR. MADISON: What about the outer perimeter of  
10 the building, the back doors, front doors -- the building  
11 itself?

12 MR. HAES: Those are all locked. Those are all  
13 locked in the evening. I can't remember what time. Maybe  
14 8:00 or -- 8:00 they have it on the cipher lock at 8:00  
15 that the campus police puts on.

16 MS. ULLRICH: The campus police are responsible  
17 for locking the building?

18 MR. HAES: Yes.

19 MS. ULLRICH: Okay.

20 MR. HAES: The campus police are responsible  
21 for locking the buildings. The researchers are responsible  
22 for locking registered laboratories.

23 MR. MADISON: Okay.

24 MS. ULLRICH: What are the principal  
25 investigator's responsibilities regarding security of

1 MR. HAES: No.

2 MS. ULLRICH: Okay. In terms of security, how  
3 accessible are the laboratories to individuals from other  
4 laboratories, to individuals who are not even perhaps from  
5 the building?

6 MR. HAES: You mean during working hours?

7 MS. ULLRICH: Well, let's start there. Let's  
8 start with working hours.

9 MR. HAES: During working hours, the  
10 laboratories are open when people are in fact working. If  
11 you are not part of the laboratory, you know, chances are  
12 you'll be challenged when you walk in there. Somebody will  
13 ask you what you're doing, what you're -- if they can help  
14 you, what you're looking for and so on.

15 The Cancer Center, as far as I understand, most  
16 people are aware of each other, who you're working for and  
17 what kind of research you're doing. So they're very  
18 familiar with each other at that particular point. So  
19 can -- you know, like somebody from Jack's lab, can they  
20 walk into the Tonegawa lab -- yeah, they can walk in there.

21 So that's accessible --

22 MS. ULLRICH: Okay.

23 MR. HAES: -- in that point. After hours, if  
24 nobody's working in the laboratories, the laboratories are  
25 locked.



1 radioactive material and the authorized -- the persons who  
2 are authorized to use materials? What are their  
3 responsibilities with respect to security of the  
4 radioactive material?

5 MR. HAES: Those are outlined in the required  
6 procedures.

7 MS. ULLRICH: Okay, and what do you expect them  
8 to do?

9 MR. HAES: Those are specifically outlined.  
10 Well, there's a number of procedures -- you know, that you  
11 have to follow for storage of radioactive materials. It  
12 has to be adequately labeled, it has to be adequately  
13 shielded. It has to be stored in such a manner as to  
14 prevent its unauthorized removal. It has to be stored to  
15 prevent damage from either fire, flooding or explosion.

16 I think that just about wraps it up.

17 MS. ULLRICH: Okay. How do some of the -- what  
18 are some of the various methods that research laboratories  
19 use to do that here?

20 MR. HAES: They have refrigerators, freezers  
21 that they store their material in. Some have lock boxes  
22 that they store things into. Some have safes they actually  
23 store their material in. So, --

24 MS. ULLRICH: Locked refrigerators? Does  
25 anybody have a lock on their refrigerators or freezers?

1 MR. HAES: I have seen refrigerators with locks  
2 on them, yes.

3 MS. ULLRICH: Okay, okay.

4 MR. HAES: Is this as it refers to just the  
5 Cancer Center or as it refers to all my authorizations?  
6 You didn't really give me the scope of what you were  
7 talking about.

8 MS. ULLRICH: Well, first with the Cancer  
9 Center. Is that -- were you referring to the Cancer Center  
10 there in that respect?

11 MR. HAES: Not in respect to safes, no.

12 MS. ULLRICH: Okay. Safes would refer to what  
13 type of use?

14 MR. HAES: Sealed sources.

15 MS. ULLRICH: The sealed sources, okay. But  
16 this is expected throughout the university then --  
17 throughout the institute?

18 MR. HAES: We're expected to follow the  
19 protocols outlines in the rules and procedures.

20 MS. ULLRICH: Okay, okay.

21 MR. MADISON: Who's responsible ultimately in  
22 each lab for that compliance?

23 MR. HAES: The registered user is responsible  
24 for complying with all the rules and procedures as outlined  
25 in the orange booklet which is the required rules and

1 procedures, and also those established by the project. So  
2 that's the first line. The second line is the principal  
3 investigator is responsible to make sure that all the  
4 material is properly stored.

5 MS. ULLRICH: Okay.

6 MR. HAES: Researchers are also responsible to  
7 make sure there's a close down at the end of the work day  
8 that they're working on to make sure that the material is  
9 stored properly and is free of contamination.

10 MR. MADISON: Where would the lab manager fit  
11 into that picture?

12 MR. HAES: The lab managers are assigned by the  
13 principal investigators. That's outside of our scope.

14 MS. ULLRICH: Okay. And is -- when a  
15 technician goes out or when you go out, are they expected  
16 to look at security of materials at all?

17 MR. HAES: Well, it's -- if you're -- I would  
18 expect them to look at the security of materials if nobody  
19 was in the laboratory.

20 MS. ULLRICH: Okay.

21 MR. HAES: But if somebody's working in the  
22 laboratory, you would expect to find material out because  
23 they're working there.

24 MS. ULLRICH: Okay, okay. And as far as  
25 receiving materials, who actually -- when you have a

1 package delivered that contains radioactive material, where  
2 does it go to?

3 MR. HAES: It goes to the room designated on  
4 the packing slip. We verify that that is in fact a  
5 registered laboratory. And the people delivering packages  
6 know where all the material gets delivered to after you've  
7 done --

8 MS. ULLRICH: That would be the public vendor  
9 or is that somebody here?

10 MR. HAES: No, the radiation protection office  
11 does all the delivery of packages.

12 MS. ULLRICH: Okay, so how do you get them  
13 then?

14 MR. HAES: The packages are received in the --  
15 this building receiving room. They call up the office when  
16 the packages come in from the vendors -- the vendor's  
17 delivery system. They give us the number of packages and  
18 the PO numbers. With the PO numbers, we can indicate on a  
19 slip what we expect to have arrived, how much as arrived,  
20 who ordered it and where it's going.

21 MS. ULLRICH: Okay.

22 MR. HAES: On a slip, we provide that to the  
23 technician who goes down there, collects the packages  
24 following the proper procedures, checks the packages in and  
25 then verifies the information that -- how much they have,

1 where it's going. And from there, if there's any  
2 questions, they call back up and we straighten anything  
3 out.

4 MS. ULLRICH: Okay, okay. And then they have  
5 their material -- they use the material as we've --

6 MR. HAES: Well, then the materials get  
7 delivered to the laboratories.

8 MS. ULLRICH: Okay.

9 MR. HAES: And you know, they make every  
10 attempt to find the end user. They deliver it to the end  
11 user and they go on their happy way.

12 MS. ULLRICH: Okay. They leave the waste in  
13 the laboratory? Is there a regular waste pick up for them,  
14 or do they have to call you?

15 MR. HAES: When the containers get near full,  
16 they're instructed to call 3674, which is the radioactive  
17 waste management program, and then those packages get  
18 picked up -- or the waste containers get picked up usually  
19 within 24 or 48 hours.

20 MS. ULLRICH: Okay, okay. I can't think of  
21 anything else I want to ask at the moment. Alan?

22 MR. MADISON: Just help me out a little bit,  
23 because this is not my normal area of involvement. The  
24 waste issue that you had with Dr. Tonegawa's lab in the  
25 past, what exactly was that?

1                   MR. HAES: That's all a matter of record. If  
2 you want to, you know, look up in the records through the  
3 radiation protection committee meeting minutes, that's --  
4 we have all that outlined.

5                   MR. MADISON: You don't remember?

6                   MR. HAES: Well, I believe it was -- there was  
7 a couple instances where there was mixed waste where there  
8 were solids and liquids together. And there were also --  
9 cards weren't filled out properly. We had to make sure  
10 that you know -- you would find a container that was full.  
11 There was a dose rate inside the container, but the card on  
12 top was empty.

13                   So we had to make sure that those got filled  
14 out. They'd have to go back through their records and find  
15 out what was in the --

16                   MR. MADISON: What did they have to go through  
17 to get off probation?

18                   MR. HAES: I spent quite a bit of time over  
19 there, and they had to make sure that they were to  
20 adequately maintain their waste records. And we  
21 scrutinized them much more than you would normally do.  
22 When the technician does his weekly surveys, he does not  
23 limit himself to just the laboratories that he's assigned  
24 to. He also walks in other laboratories.

25                   In this case, we were increasing our

1 surveillance of it. We were making more of a presence  
2 known, and we were scrutinizing the waste stream much more  
3 closely than we would normally do.

4 MR. MADISON: Okay. And when did they get off  
5 probation, do you remember that?

6 MR. HAES: We put them on a -- I believe it was  
7 a quarterly review. And after two quarters of adequate  
8 following procedures, they were off probation.

9 MR. MADISON: Okay.

10 MR. HAES: And they put the authorization in  
11 for a full two year renewal.

12 MR. MADISON: I don't know if we've done this,  
13 and you may already be familiar with Bob's background, but  
14 I'd just like to know what your background is?

15 MR. HAES: Don.

16 MR. MADISON: Yours. Don. I'm sorry.

17 MR. HAES: Okay. What's my background? I  
18 first started in radiation protection in 1976 in the Navy  
19 going through nuclear power school. After nuclear power  
20 school, I went through SIC prototype training. I became an  
21 engineering laboratory technician in the United States  
22 Navy. I was on board U.S. submarines as a qualified  
23 mechanical operator and a qualified engineering laboratory  
24 technician.

25 When I got out of the Navy, I acquired a



1 position at -- which was then during the nuclear -- which  
2 was then soon bought out by DuPont, which became DuPont NEN  
3 Products. I worked in the Cyclotron chemistry group  
4 manufacturing radiopharmaceuticals. At that point, I was  
5 going to school days towards a bachelor's degree in health  
6 physics and working second shift at DuPont NEN Products.

7 I worked there for a little over seven years.  
8 I had worked up to supervisor of Molly 99 and Zenon 133  
9 process working early, early morning shift. And again,  
10 going to school full time, and finished up a master's  
11 degree. From there, after I finished up my master's  
12 degree, I gained employment here as an assistant RSO in  
13 October of '88.

14 And since then, I've received certification by  
15 the American Board of Health Physics, and I've been here  
16 every since. So prior to working here, most of my  
17 experience was in curie quantities, kilocurie quantities,  
18 and even megacurie quantities of material. We worked with  
19 kilocuries on a daily basis. And then here, it's more of a  
20 microcurie and millicurie --

21 My particular area of expertise right now is in  
22 non-ionizing radiation. That's where I put most of my  
23 effort into right now is in non-ionizing radiation.

24 MR. MADISON: Okay, thank you.

25 MS. ULLRICH: With that background, have you

1 ever come across an ingestion contamination incident at  
2 all, much less anything similar to this?

3 MR. HAES: I hesitate to explain the background  
4 of any incidents that may have occurred in other licensees.

5 MS. ULLRICH: Okay.

6 MR. HAES: But to answer the question in  
7 general, yes. I've been involved either observing or been  
8 directly involved in many cases of contamination and  
9 ingestion of materials.

10 MS. ULLRICH: Has that --

11 MR. HAES: And inhalation.

12 MS. ULLRICH: -- background given you any ideas  
13 about how this has happened or eliminated ideas for you as  
14 to how this one might have happened?

15 MR. HAES: Well, understanding P-32 the way I  
16 did because we used to make it at DuPont, I understand that  
17 in order for it to volatilize into the atmosphere, you have  
18 to boil it down. Once you boil it down, then it does  
19 volatilize quite easily. But you do have to boil it down  
20 and have a vented atmosphere.

21 So as far as this particular investigation, in  
22 my mind I had ruled out inhalation, which leaves either  
23 absorption, injection, or ingestion. After surveying the  
24 body, it was apparent that there was no injection point  
25 that we could see. I mean, if there was an injection

1 point, you would assume that would be the hottest part of  
2 the body.

3 In my experience of injection of material,  
4 there wasn't any. So therefore, we assumed that it had to  
5 be an ingestion.

6 MS. ULLRICH: Okay.

7 MR. HAES: It was also apparent that it had  
8 happened earlier than that -- than the particular day in  
9 question in fact because it was apparently throughout all  
10 the bones of the body, which is where you would expect it  
11 to go.

12 MS. ULLRICH: Okay. So you're fairly confident  
13 that it was an ingestion?

14 MR. HAES: Yes.

15 MS. ULLRICH: Okay.

16 MR. HAES: You know, based on all the  
17 information that we have, it was an ingestion, yes.

18 MS. ULLRICH: Okay. All right, I don't have  
19 any further questions at this time.

20 MR. MADISON: I don't either.

21 MS. ULLRICH: Do you have anything -- any  
22 additional information you can think of or anything you  
23 wanted to say or ask of us?

24 MR. HAES: I don't think so, no.

25 MS. ULLRICH: Okay. Then I guess we can go off

1 the record.

2 MR. MADISON: Do you know of anybody else that  
3 we should talk to or that wants to talk to us?

4 MR. HAES: I don't know of anybody who would  
5 like to talk to you.

6 (Laughter.)

7 MS. ULLRICH: Okay.

8 MR. MADISON: We will provide you a phone  
9 number in case you should change your mind or have  
10 additional information --

11 MR. HAES: Great.

12 MR. MADISON: -- if you find somebody that  
13 does. And I believe Betsy's going to also give you Exhibit  
14 3-1, which will again further explain how the handling of  
15 transcripts is done. Thanks for your time.

16 MS. ULLRICH: And we will now go off the record  
17 at 2:55.

18 (Whereupon, the proceedings were adjourned at  
19 2:55 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 DONALD L. HAES, JR.

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.

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C. Pyott  
Official Reporter  
Neal R. Gross and Co., Inc.