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UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

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INCIDENT INVESTIGATION TEAM

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INTERVIEW OF MITCHELL S. GALANEK

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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WEDNESDAY, OCTOBER 18, 1995

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1:18 P.M.

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19 INTERVIEWERS:

20

SAMI SHERBINI

21

LAWRENCE L. ROBINSON

22

GREGGORY P. GONECONTO

23

THOMAS O'CONNELL

24

25

## ADDENDUM

Page	Line	Correction and Reason for Correction
5	24-25	So they become an authorized user. I guess does not belong in the sentence
6	17-18	Eliminate "with an individual" the intended statement is "If its an individual we have problems with, that retaining might be done individually"
<del>6</del> 6	22	replace user with "authorized user"
7	17	recessive materials "are" received. Insert "are" to make correct.
8	15	It isn't should be removed
9	4	Change look to looked and remove "is also"
10	1	Replace Yeah with yes
10	2	replace bowel with vial
10	9	Our program is <del>Our</del> RPO waste management program
10	11	replace edited with added
11	11	replace fresh with new
11	19	<del>answer</del> answer is in response to waste management not total use in the laboratory.
12	9	replace they said okay <del>Sammy</del> with you were asked
13	5-8	Actually . . . that Should be removed makes no sense relevant to question asked

# ADDENDUM

Page	Line	Correction and Reason for Correction
15	2	This comment is in reference to daytime hours
15	3	Replace yeah with yes
16	24	Replace "someone calls and says" with nothing (remove).
17	9	replace "it could be a" with "for the"
17	21	replace yeah with yes
17	23	replace "in that" with "on emergency response".
18	13	replace yeah with yes
18	21-23	the requirement as an environmental medical service employee is on call. That employee may be an industrial hygienist, a biohazard officer, or a radiation safety officer.
21	21	replace yeah with yes
23	11	replace yeah with yes
25	15	anything from the rinse water
28	10	replace do with did
29	10	replace ran with analyzed
37	1	since it's a little ... research had told me - Sentence should start with Dr. Li told me
57	4	replace we with he (meaning Li)
59	12	replace see with measure
63	8	replace know that know with know that now
Page 2	Date 10/20/95	Signature: <u>Mark Lee</u>

# ADDENDUM

Page

Line

Correction and Reason for Correction

64 21 No is not correct answer. My answer  
should have been Dr. David Diamond or  
Dr. Robert McManney our Board Certified  
Occupational Physicians. I must have  
been confused when I answered no.

74 64 replace it with he's add "first"  
after the



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

(1:18 p.m.)

MR. SHERBINI: Okay, it's about 1:15, and we are about to talk with Mitch Galanek, Assistant RSO?

MR. GALANEK: Associate RSO.

MR. SHERBINI: Associate RSO. My name is Sami Sherbini, and if you would quickly identify yourself just for the record?

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

MR. GONECONTO: Greg Goneconto, Special Agent with the U.S. Nuclear Regulatory Commission, Office of the Inspector General.

MR. ROBINSON: Larry Robinson, Senior Investigator with the Office of Investigations of NRC.

MR. GALANEK: And Mitch Galanek, MIT Associate Radiation Protection Officer.

MR. SHERBINI: Just for the record, Mitch, I'll go over quickly the purpose of the team and the inspection and so forth just to make sure it's established before we start. The purpose of the team, as we spoke yesterday, is to try and establish what happened and why -- the causes. And if there are any lessons learned, to extract those and distribute them and make sure everybody knows about them.

The reason for this interview is, since you

1 were directly involved to the incident, we would like to  
2 know from you what actions were taken, what you saw, and  
3 what was said and so forth, just to try and reconstruct the  
4 sequence of events. The interview is being transcribed  
5 partly to have a factual record of what was said and to  
6 minimize note taking so that we don't have to write  
7 everything that's being said ourselves.

8           At a later time, you will have a transcript of  
9 the interview, and you will be able to read it, see if what  
10 you said was transcribed correctly. And you can add to the  
11 record if you feel that what was said did not convey what  
12 you had intended to say and so forth. If you want to make  
13 corrections, you will be given an errata sheet to write the  
14 corrections in it, and the corrections then will become  
15 part of the record.

16           And of course, the transcript is going to be a  
17 public document eventually when the report is published.  
18 All the transcript and all the paperwork is going to be put  
19 in the public document room for the NRC. And so, it's  
20 available for anybody to read.

21           Okay, having said that, we can proceed with the  
22 -- my questions will be mainly on radiation safety and  
23 radioactive material surveys and so forth. And I'd like to  
24 start off by getting some kind of an understanding of how  
25 radioactive material is received in and then discarded as

1 waste and how it's tracked through this process just to get  
2 a feel for if there are any weak points where it can slip  
3 out.

4 MR. GALANEK: Okay, well, we have approximately  
5 200 or so authorized projects that are allowed to work with  
6 radioactive material on campus. And --

7 MR. SHERBINI: An authorized project is the  
8 same as an authorized user?

9 MR. GALANEK: No, there are then authorized  
10 users or radiation workers within that project.

11 MR. SHERBINI: Okay.

12 MR. GALANEK: So in this particular instance,  
13 Professor Susumu Tonegawa is the project supervisor. Maybe  
14 you call them authorized user. He is responsible for the  
15 project. He applied to our office. Someone in our office  
16 reviewed how they would use the radioactive material, see  
17 that they have appropriate lab space, appropriate  
18 safeguards to use it safely, and then write a review that  
19 goes to our radiation protection committee.

20 And they would be the ones who approve or add  
21 conditions of approval as necessary.

22 MR. SHERBINI: Okay.

23 MR. GALANEK: And then every worker within the  
24 Tonegawa project then becomes an authorized user of  
25 radioactive material after they have trained with us. So

1 within this authorization -- some people I think call them  
2 principal investigators. We happen to call them project  
3 supervisors. And then the people underneath are -- we call  
4 them radiation workers.

5 MR. SHERBINI: Okay. So in other words, you  
6 call Dr. Tonegawa the authorized user?

7 MR. GALANEK: We call him the project  
8 supervisor.

9 MR. SHERBINI: Yeah, okay. Now, anybody who  
10 works for him in the lab may become an authorized user?

11 MR. GALANEK: Correct.

12 MR. SHERBINI: What are the requirements to  
13 become an authorized user?

14 MR. GALANEK: To become an authorized user,  
15 they attend a training session given by the radiation  
16 protection office.

17 MR. SHERBINI: Okay.

18 MR. GALANEK: And then they are required to  
19 pass a short exam, and then given proper dosimetry.  
20 They're allowed to work with radioactive material in the  
21 lab.

22 MR. SHERBINI: Okay.

23 MR. GALANEK: So they would become part of that  
24 authorization, and a user of radioactive materials. So  
25 that's I guess an authorized user.



1           MR. SHERBINI: Okay. Is there retraining --  
2 periodic retraining?

3           MR. GALANEK: Yes. Our requirement for the  
4 license is that we renew each authorization every two  
5 years. And at that time, we go and sit with the group,  
6 review the authorization, the conditions of approval,  
7 anything new, changes in regulations -- you know, typical  
8 retraining type session. And we're required to do that  
9 at -- when we renew that authorization.

10           We also provide retraining if we have problems  
11 in laboratories. So if your laboratory is a bit negligent  
12 and we find some radioactive material in the non-  
13 radioactive trash or we're finding repeated contamination  
14 on lab benches, then we will call the group together and we  
15 will have a retraining session at that time.

16           MR. SHERBINI: Okay.

17           MR. GALANEK: If it's an individual -- we seem  
18 to have problems with an individual, that retraining might  
19 happen just individually.

20           MR. SHERBINI: Okay. All right, now if we get  
21 back to the inventory question.

22           MR. GALANEK: So now if you are a user, you can  
23 order some radioactive material.

24           MR. SHERBINI: Okay.

25           MR. GALANEK: So you place that order through

1 our office. We make sure that you in fact have been  
2 trained, that you're registered, you are a user. And that  
3 radionuclide and the amount that you're authorized -- that  
4 you're authorized to use that radionuclide and that amount.

5 MR. SHERBINI: Okay.

6 MR. GALANEK: And then when you place that  
7 order, you have to give us your current inventory of what's  
8 in the laboratory so that we're not exceeding the  
9 authorized inventory for that group.

10 MR. SHERBINI: Okay. Then you place the order?

11 MR. GALANEK: Then what we do is we give you  
12 approval. You place the order.

13 MR. SHERBINI: Oh, they place the order.

14 MR. GALANEK: Correct.

15 MR. SHERBINI: Okay. Then when it comes on  
16 site?

17 MR. GALANEK: All radioactive materials  
18 received at this building, Building 20, --

19 MR. SHERBINI: Or your office.

20 MR. GALANEK: Right, it comes into the shipping  
21 room -- receiving room. They call us up that the packages  
22 are here and we go in, pick them up, take them down the  
23 hall and do our check in procedure and then deliver them to  
24 the end user.

25 MR. SHERBINI: Okay. How do they do inventory?

1 MR. GALANEK: In the laboratory?

2 MR. SHERBINI: Yeah.

3 MR. GALANEK: Laboratories typically will have  
4 either some person assigned to that or they might have a  
5 sign up sheet for vials when they come in to keep record as  
6 people remove material from those stock vials.

7 MR. SHERBINI: Okay, when the shipment comes  
8 in, you hand it to the lab supervisor or the lab --

9 MR. GALANEK: No, we try to hand it to the end  
10 user. That isn't always the case. But someone in the  
11 laboratory that's a radiation worker.

12 MR. SHERBINI: So whoever ordered it gets the  
13 package?

14 MR. GALANEK: Correct. It's nice when we can  
15 do that. It isn't --

16 MR. SHERBINI: Okay.

17 MR. GALANEK: But that's what we attempt to do.

18 MR. SHERBINI: Okay. And then the radioactive  
19 material is taken out of the package and stored in the --

20 MR. GALANEK: In the laboratory.

21 MR. SHERBINI: Is that common procedure for  
22 everybody or does every researcher have his own storage  
23 space?

24 MR. GALANEK: Are you asking me specific to the  
25 Tonegawa lab or in general?

1 MR. SHERBINI: Yeah, no -- well, Tonegawa lab  
2 in particular, yes.

3 MR. GALANEK: Okay, that was where -- the  
4 refrigerator where they now have the lock box is also --  
5 was a common refrigerator for all of their radioactive  
6 stock.

7 MR. SHERBINI: Okay. So all radioactive  
8 material received by that lab goes into that refrigerator?

9 MR. GALANEK: That's my understanding.

10 MR. SHERBINI: Okay. Is that true for other  
11 labs on campus, or is that --

12 MR. GALANEK: That's typically the process. We  
13 don't require that, but that's typically the process that  
14 they have one refrigerator or freezer where all of the  
15 stock vials end up.

16 MR. SHERBINI: Okay. And as the researcher  
17 needs the material, they would go to the refrigerator to  
18 take it out?

19 MR. GALANEK: Correct.

20 MR. SHERBINI: And they would record in some  
21 log that they took out --

22 MR. GALANEK: That's what they are required to  
23 do.

24 MR. SHERBINI: Okay. Now after they use it,  
25 what happens to the waste? Do they record that too?

1           MR. GALANEK: Yeah, we have receptacles for  
2 solid waste, liquid waste and liquid scintillation bowl  
3 waste, and the sanitary sewage system. And so, any of  
4 those receptacles that they use, they're required to log  
5 the radionuclide and the amount -- or the approximate  
6 amount that they put in there.

7           MR. SHERBINI: Okay. And all these sheets  
8 then, where do they go after that?

9           MR. GALANEK: Our program collects the  
10 radioactive waste from the laboratories and then that's  
11 edited into our data base system depending on whether we  
12 are holding for radiological decay or preparing for  
13 shipment.

14          MR. SHERBINI: Is there some way where -- some  
15 way of balancing input versus -- received versus disposal  
16 from the records to account for all the material that was  
17 received or --

18          MR. GALANEK: If your question is could we do  
19 that, it's possible.

20          MR. SHERBINI: No, is it --

21          MR. GALANEK: Could we balance -- would we mass  
22 balance what comes in and what goes out, the answer is in  
23 reality no.

24          MR. SHERBINI: Okay. So what happens to the  
25 sheets where the researchers record what they use from the



1 refrigerators and how much waste they dispose into various  
2 receptacles?

3 MR. GALANEK: Again, we collect the -- once it  
4 goes into the laboratory, we assume it's only coming out as  
5 waste.

6 MR. SHERBINI: Okay.

7 MR. GALANEK: Or it's decayed.

8 MR. SHERBINI: Okay.

9 MR. GALANEK: And so we're collecting the --  
10 when they call us to remove waste from the laboratory, we  
11 take those records and we put a fresh record out for  
12 filling that container again.

13 MR. SHERBINI: So the waste record is just to  
14 tell you how much waste you have to dispose of basically?

15 MR. GALANEK: Correct.

16 MR. SHERBINI: Okay. Does the lab manager or  
17 the authorized project do any kind of inventory  
18 periodically to see what was used or where it went?

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

20 MR. SHERBINI: In connection with this  
21 incident, there was a certain quantity of material that was  
22 found missing. And you know, based on your description of  
23 this process, how was that quantity found missing? How did  
24 they determine that?

25 MR. GALANEK: They went -- they were given the

1 charge after we stopped them from using radioactive  
2 material to go back and review their inventory records and  
3 their use records to determine if we could balance what  
4 they had received for the past several weeks with what they  
5 had used.

6 MR. SHERBINI: Okay.

7 MR. GALANEK: So the way I believe the process  
8 happened was their lab manager went to each person -- if  
9 you worked in the lab, they said okay Sammy, how many  
10 experiments have you done in the last two weeks and how  
11 much radioactivity? And so, in your lab book, you could  
12 produce this data and what vial it was used from.

13 MR. SHERBINI: Would that be in the lab book?  
14 There was also supposedly a sheet that's at the  
15 refrigerator where every time you take something out --

16 MR. GALANEK: Right. But I believe to get it  
17 down to this supposed accuracy, they went back to their lab  
18 books to look at what everyone used.

19 MR. SHERBINI: Okay. So they checked how much  
20 everyone used in the lab books against what was received?

21 MR. GALANEK: Correct.

22 MR. SHERBINI: And there was a quantity  
23 missing?

24 MR. GALANEK: Correct.

25 MR. SHERBINI: How much was missing?

1 MR. GALANEK: I think they calculated it at 473  
2 microcuries.

3 MR. SHERBINI: Okay. Do they allow for decay  
4 and all of this?

5 MR. GALANEK: I've asked that question, and  
6 they said yes. Actually -- right, they went to -- because  
7 the suppliers give you a -- it's a ten day overage actually  
8 to pre-calc most of that.

9 MR. SHERBINI: Could this amount have been  
10 disposed of as waste or do they include the waste in that  
11 tally?

12 MR. GALANEK: I don't know that. Don Haes from  
13 my office probably would be the better person to answer  
14 that question. It happens that when this revelation came  
15 about, I was not in that day. When I came back the next  
16 morning, I was told that in fact they had found some 475  
17 microcuries missing. So I've only ever read the report  
18 given to me.

19 MR. SHERBINI: Okay. And Don Haes was the one  
20 who looked at the inventory data and concluded that --

21 MR. GALANEK: Well, it was actually their lab  
22 manager, Dennis King -- Dr. Dennis King --

23 MR. SHERBINI: Okay.

24 MR. GALANEK: -- who was charged with putting  
25 that all together with all the users in the laboratory. So

1 in our organizational chart or our duties, our assistant  
2 radiation safety officers provide our radiation protection  
3 services to different authorized groups. And it just  
4 happens that the Tonegawa lab, the service is provided by  
5 Don Haes of our group. So they worked together closely on  
6 this.

7 MR. SHERBINI: Okay. Is there any security in  
8 the labs -- people not working in the lab -- can people not  
9 working in the lab come into the lab and -- or is that an  
10 informal process?

11 MR. GALANEK: It's an informal process. We  
12 went for a tour yesterday. You can see that the doors are  
13 open. When there are people in the laboratory complex,  
14 they leave the doors open. They are instructed that when  
15 there is no one going to be present, those lab doors are  
16 supposed to be closed and locked.

17 MR. SHERBINI: So there is a requirement when  
18 the lab is empty --

19 MR. GALANEK: Correct.

20 MR. SHERBINI: -- to lock the doors?

21 MR. GALANEK: Correct, correct.

22 MR. SHERBINI: Okay.

23 MR. GALANEK: So if you wanted to know can we  
24 go over there and walk in that laboratory now, I would say  
25 that that's probably a probability of one.

1 MR. ROBINSON: And could anyone off the street  
2 just walk in and walk into the lab?

3 MR. GALANEK: Yeah, I guess they could. Yeah,  
4 all the doors at MIT are open. So with all of those  
5 entrances and exits and egress -- absolutely.

6 MR. ROBINSON: Okay.

7 MR. SHERBINI: But how do they insure the  
8 security of the radioactive material? Just by somebody  
9 being present?

10 MR. GALANEK: Correct.

11 MR. SHERBINI: But would -- the way the labs  
12 are constructed, it's not possible to see the refrigerator  
13 when you're working in most areas in the lab? That's  
14 probably --

15 MR. GALANEK: That's a correct observation.

16 MR. SHERBINI: So it would be difficult really  
17 to watch the refrigerator at all times when --

18 MR. GALANEK: I would say that that's accurate.  
19 There probably is not anyone watching that refrigerator at  
20 all times.

21 MR. SHERBINI: Okay. Okay, if we go back to  
22 the day when Dr. Li called you or called the police, is  
23 that standard procedure if a contamination is discovered, I  
24 guess on weekends to call the campus security?

25 MR. GALANEK: Yeah, our office hours are pretty



1 much 8:30 to 5:00. And that anytime outside of that,  
2 certainly you can try us at the office. There are people  
3 here, but we -- during training instruct people that the  
4 emergency procedure is dial 100 and that will put you in  
5 touch with campus police.

6 MR. SHERBINI: Okay.

7 MR. GALANEK: And so campus police have a list  
8 of who's on call. And so from our environmental medical  
9 service, there is someone you can reach. And then  
10 depending on why or the incident involved, in this case an  
11 industrial hygienist was on call, the incident was  
12 described to him and he said I will get someone from  
13 radiation protection.

14 MR. SHERBINI: Okay, so that's really -- so the  
15 instruction to the campus police then is if it's  
16 radioactive then call this person?

17 MR. GALANEK: No, no. The instruction to  
18 campus police is call the environmental medical service on  
19 call person. There was an organizational chart that I  
20 brought out last night. So at any given time, any one of  
21 us can be on call for our department.

22 MR. SHERBINI: Okay.

23 MR. GALANEK: And then so if you are an  
24 industrial hygienist and someone calls and says -- campus  
25 police calls and says we have a radioactive spill in

1 Building E25 on the second floor, your response will  
2 probably be I'll get hold of Mitch Galanek or someone from  
3 our crew.

4 MR. SHERBINI: So what would trigger a call,  
5 any radioactive --

6 MR. GALANEK: Yeah, we tell people that we want  
7 to be made aware of any problem or incident that they have  
8 with radioactive material, even if they consider it  
9 trivial. If there was a potential -- it could be a spread  
10 of contamination or that they feel that they have been  
11 contaminated, we would like them to call us.

12 MR. SHERBINI: Do they have formal training in  
13 that or formal procedures on what to do in case of  
14 different kinds of events?

15 MR. GALANEK: The procedure is reviewed at  
16 training. And so, --

17 MR. SHERBINI: They do have a procedure -- do  
18 the police have a procedure, the campus police, on what to  
19 do in case of, say, a radioactive incident -- radioactive  
20 material incident?

21 MR. GALANEK: Yeah, I'm guessing they do. I  
22 mean, we can see if there's actually a written document.  
23 We give them annual training on that. And so, every year  
24 we go through and sit and this is what you do and --

25 MR. SHERBINI: So they are given annual

1 training as required?

2 MR. GALANEK: Correct, correct.

3 MR. SHERBINI: Okay, but you're not sure if  
4 they do have an actual procedure that describes what the  
5 steps are?

6 MR. GALANEK: Because we have a nuclear reactor  
7 on campus, I know that they have a lot of procedures. And  
8 so, they're given a packet of -- well, I know that I gave  
9 the retraining last year. I know I gave them a training  
10 packet that has a procedure on what to do in an emergency.  
11 So, I would say yes, they have that information.

12 MR. SHERBINI: On an radiological emergency?

13 MR. GALANEK: Yeah.

14 MR. SHERBINI: Okay. And according to what you  
15 said before, the procedure essentially is to call the  
16 industrial hygienist on call at that time?

17 MR. GALANEK: Right. It just happened that  
18 there was an industrial hygienist on call.

19 MR. SHERBINI: It's not required that one be on  
20 call?

21 MR. GALANEK: No, there's no requirement that  
22 an industrial hygienist or a radiation protection person or  
23 a -- the other part of our triumvirate is biosafety. Any  
24 one of us could -- I was just on call for this past week.

25 MR. SHERBINI: Okay.

1           MR. GALANEK: If I received a call and someone  
2 said I've just spilt a two liter flask of aflatoxin, I'm  
3 not an expert at aflatoxin, but Dr. Claudia Micholson may  
4 be. So I'm calling her or someone on her crew and say you  
5 got to get into the Institute. I will come in and assist  
6 you, but you need to take the lead in this. r because  
7 this was a radiation incident, that's why I was called.

8           MR. SHERBINI: So they would call you and you  
9 would call her and then decide --

10          MR. GALANEK: Yeah, if I was the on call  
11 person, I'd make a decision at that point. Is this  
12 something I can handle, or do I need to call an expert in  
13 one of our three areas?

14          MR. SHERBINI: How about if there was a medical  
15 emergency connected with the radioactive incident? Do the  
16 police know what to do or would they still call you and ask  
17 what should we do?

18          MR. GALANEK: They are trained to take a  
19 medical emergency to a medical, whether there's radioactive  
20 contamination or not.

21          MR. SHERBINI: Okay, on that -- I guess on that  
22 day when Dr. Li called them, they called you.

23          MR. GALANEK: Correct -- they called Tom Lynch,  
24 the industrial hygienist. That's in that police report.

25          MR. SHERBINI: Okay. He was on call?

1 MR. GALANEK: Right.

2 MR. SHERBINI: And he called you?

3 MR. GALANEK: Correct.

4 MR. SHERBINI: Okay. And I believe they took  
5 him --

6 MR. GALANEK: To the medical department.

7 MR. SHERBINI: To the medical department. Does  
8 the medical department know what to do? Do they have  
9 somebody trained in radiological emergencies?

10 MR. GALANEK: Yeah, we have training with  
11 people at the medical department.

12 MR. SHERBINI: Are there specific doctors who  
13 are trained in this, or can any person on duty at the  
14 medical facility handle this kind of situation?

15 MR. GALANEK: Well, there's an isolation room  
16 where there's a set of procedures and a geiger counter and  
17 some gloves and bags and things to try to isolate  
18 contaminated people. And so we have provided training for  
19 people in the medical department over time. If you're  
20 going to ask me was the doctor that Saturday night trained,  
21 he was not.

22 MR. SHERBINI: Well, I'm trying to really  
23 determine what the process is basically. In other words,  
24 there are lots of people using radioactive material.

25 MR. GALANEK: Right.



1 MR. SHERBINI: If there is a situation like  
2 this incident, I'm trying to determine -- once it gets to  
3 the campus police, then they want to do something --

4 UNIDENTIFIED WOMAN: Is this the --

5 MR. GALANEK: No, I wondering. I thought you  
6 were part of them. Call down to 20C207.

7 UNIDENTIFIED WOMAN: Thank you.

8 MR. GALANEK: I probably should put the NRC  
9 notice also on this door.

10 MR. SHERBINI: There is a notice on the door  
11 that says to go to 20C.

12 MR. GALANEK: Oh, it does? Okay.

13 MR. SHERBINI: Yeah, I'm trying to understand,  
14 in situations like this where there might be a need to  
15 take, you know, some kind of prophylactic action or  
16 something because of a fairly serious intake, would the  
17 campus police know what to do or would the medical staff  
18 who would likely see this person when the police take them  
19 there know what to do or know who to call to find out what  
20 to do?

21 MR. GALANEK: Yeah, I think that what they know  
22 is know who to call -- that they would want to call someone  
23 from the radiation protection office.

24 MR. SHERBINI: Okay, so they would call you?

25 MR. GALANEK: Myself or Frank or Don or Bill.

1 Right, someone from our staff.

2 MR. SHERBINI: Okay. What -- do you remember  
3 about what time you got the call that Dr. Li was  
4 contaminated?

5 MR. GALANEK: My guess it came in somewhere  
6 between 5:30 and 6:00. And I will tell you why -- I picked  
7 up my sister, who came in on the train with my niece. I  
8 brought them to my parents house, and I arrived home at  
9 6:00. And that's when my wife said to me MIT is trying to  
10 get hold of you.

11 MR. SHERBINI: Okay.

12 MR. GALANEK: So I phoned back at 6:00 p.m.

13 MR. SHERBINI: To the police?

14 MR. GALANEK: Right. And then they said they  
15 had brought someone to medical, and I called there and I  
16 believe a woman Eileen answered the phone, but they put me  
17 on with Dr. Roger Hajjar, who was the attending --

18 MR. SHERBINI: Who was treating Dr. Li?

19 MR. GALANEK: Correct.

20 MR. SHERBINI: And then you came in?

21 MR. GALANEK: Correct. Well, I called Frank  
22 Masse, but I did not reach him. I reached an answering  
23 service, and then I called back to say I was coming in and  
24 to rinse Dr. Li's mouth out to see if we can get it to a  
25 point -- my thinking was -- well, just keep rinsing his

1 mouth until no further contamination is being removed from  
2 his mouth.

3 MR. SHERBINI: So the idea was to rinse his  
4 mouth and collect the water and then count it?

5 MR. GALANEK: Correct, correct.

6 MR. SHERBINI: Do they have the capability to  
7 do that? Can they count that?

8 MR. GALANEK: No, I was coming in to do that.

9 MR. SHERBINI: Oh, so they were going to just  
10 keep it for you?

11 MR. GALANEK: Yeah, just keep it -- keep  
12 rinsing his mouth and see if -- you know, not knowing what  
13 was lying ahead, was there something that could be rinsed,  
14 and just with a geiger counter they would be able to see  
15 that either this rinse water wasn't registering anything,  
16 or that his mouth was -- as an example, say it were reading  
17 five, it was now reading two or is now reading one or was  
18 now reading .1.

19 MR. SHERBINI: Okay. Do they have a geiger  
20 counter?

21 MR. GALANEK: Yes, they do.

22 MR. SHERBINI: They do?

23 MR. GALANEK: And Dr. Li had brought his with  
24 him from the lab, so they had two geiger counters.

25 MR. SHERBINI: And so they did that? They

1     rinsed his mouth?

2                   MR. GALANEK:   Correct.

3                   MR. SHERBINI:   And was it contaminated?

4                   MR. GALANEK:   No.

5                   MR. SHERBINI:   Okay.

6                   MR. GALANEK:   Right.

7                   MR. SHERBINI:   So you came in about what time?

8                   MR. GALANEK:   I would guess I arrived at 7:00.

9                   MR. SHERBINI:   7:00?   Okay.   At the medical

10    facility?

11                   MR. GALANEK:   Correct.

12                   MR. SHERBINI:   And Dr. Li was still there?

13                   MR. GALANEK:   Correct.

14                   MR. SHERBINI:   Okay, and what happened next?

15                   MR. GALANEK:   Excuse me?

16                   MR. SHERBINI:   What happened next?

17                   MR. GALANEK:   Well, I surveyed him myself.   It

18    was obvious that there was no contamination on his clothes,

19    that it was coming from him and all parts of him.

20                   MR. SHERBINI:   He had removed his clothes?

21                   MR. GALANEK:   No, just by lifting his clothes

22    and -- we were not getting any change in the reading.   We

23    were getting readings all along his arm.   He had shorts

24    on -- down his legs.   Everywhere where there was bone

25    surface there was a reading of the Bremstrahlung x-rays.

1 MR. SHERBINI: Okay. Did you not see any  
2 concentrations anywhere, or was it just uniformly hot?

3 MR. GALANEK: No, it turned out that -- I  
4 believe his knee caps were a little higher. His skull was  
5 a bit higher than the chest area, than the fattier part of  
6 the legs or down -- I have those numbers for you. But no  
7 more concentrated in his mouth that it was on the top of  
8 his head or in some other places.

9 MR. SHERBINI: Okay, so it was -- there was  
10 nothing localized? You couldn't tell that there was  
11 anything localized?

12 MR. GALANEK: Correct.

13 MR. SHERBINI: Just general contamination?

14 MR. GALANEK: Correct. And I could not measure  
15 anything from the -- with the Geiger-Mueller. I mean,  
16 compared to him, I would have thought I could measure  
17 something in that rinse water, and I could not measure  
18 anything with the Geiger-Mueller detector.

19 MR. SHERBINI: Okay. And that was about 7:00  
20 when you got there roughly?

21 MR. GALANEK: Yeah, I would --

22 MR. SHERBINI: In the medical facility?

23 MR. GALANEK: I live in Plymouth. It's 42  
24 miles away. Saturday evening, there's not a whole lot of  
25 traffic coming into the city, so I would say I made it here

1 in 45 minutes.

2 MR. SHERBINI: Okay. And then what happened  
3 after that?

4 MR. GALANEK: Well, we -- they had a urine  
5 sample for us. They had -- we collected his --

6 MR. SHERBINI: The doctor had -- the physician  
7 had collected it before you got there?

8 MR. GALANEK: Correct. There was a urine  
9 sample. I'm not clear now whether they collected it there  
10 or Dr. Li brought it with him.

11 MR. SHERBINI: Okay.

12 MR. GALANEK: They had taken a blood sample,  
13 and they had taken a -- and we had now his rinse from his  
14 mouth.

15 MR. SHERBINI: Yeah, okay.

16 MR. GALANEK: We talked about what he had done  
17 that day. He had told us that he had worked with about  
18 50 -- well, he told us he had done an experiment with 50  
19 microcuries of P-32 that day. Not getting anything -- any  
20 reading in that rinse water, and it being so widespread or  
21 systemic, it didn't seem to me that if he had worked at  
22 11:00 that morning or so that it could be throughout the  
23 body so quickly and not have something coming out of his  
24 mouth.

25 MR. SHERBINI: Okay.

1 MR. GALANEK: We --

2 MR. ROBINSON: Did he make any statements about  
3 what he thought happened at that time? Did he have any  
4 idea about what he had thought happened to you? Did he  
5 make any comments?

6 MR. GALANEK: Not that I'm aware of. Not that  
7 I can recall. I know Don Haes said to him I have to ask  
8 you, did you take this yourself or did you mouth pipette?  
9 And he said no. But he -- I don't recall him volunteering  
10 anything to us.

11 MR. SHERBINI: Just an aside, does anybody do  
12 mouth pipetting in Dr. Tonegawa's lab to your knowledge?

13 MR. GALANEK: No, because if we had knowledge  
14 of that, we wouldn't allow them to do it. No, I don't  
15 believe with the concentrations today of the radioactive  
16 material that people work with that mouth pipetting is even  
17 a feasible procedure.

18 MR. SHERBINI: Is it used at all in any  
19 experiments to your knowledge in the lab?

20 MR. GALANEK: No, not that I'm aware of.

21 MR. SHERBINI: Okay.

22 MR. GALANEK: I mean, could I envision walking  
23 into a laboratory and someone is pipetting a solution of  
24 sodium chloride and they stick that glass pipette in and  
25 suck on it? Yeah, I think that could happen. But I don't



1 know of anybody who does that. I just can't envision that.

2 MR. SHERBINI: Okay. Okay, so you had the  
3 samples and --

4 MR. GALANEK: Not radioactive sodium now. I'm  
5 talking about salt.

6 MR. SHERBINI: Right. So you -- what happened  
7 after that with the samples and --

8 MR. GALANEK: We walked back to the Tonegawa  
9 labs and we asked him to show us what he had done that day,  
10 where he experiments, and then Don and I do a survey of all  
11 the area to see if we can find something that has caused  
12 this internal contamination of Dr. Li. And so, from the --  
13 well, they have a little meeting room up toward the front  
14 of where -- to where Dr. Tonegawa's office is, all through  
15 which is an administrative area, through all of those  
16 laboratories.

17 We did Geiger-Mueller surveys and found  
18 nothing. We surveyed out in the hallway, the corridors,  
19 the conference room where this is this water bottle. Not  
20 knowing a whole lot about what had happened at NIH, but  
21 hearing some rumors because we had just been at the Health  
22 Physics Society Annual Meeting in Boston, that there was a  
23 water cooler in question, we checked the Poland water  
24 supply, checked all the rugs.

25 They have a box to recycle cans and bottles.

1 We checked that. We checked all of his desk area, his  
2 briefcase, his personal belongings. You got some crackers,  
3 as I recall, he says he brings in every day. We checked  
4 that. We checked his coffee cup. Anything that he had and  
5 all of his personal belongings, we checked all of that.

6 There was no evidence of any contamination that  
7 night.

8 MR. SHERBINI: Okay. Then what happened?

9 MR. GALANEK: We walked back to my car, drove  
10 over to Building 20, and we did a whole body count.

11 MR. SHERBINI: What's Building 20?

12 MR. GALANEK: Yeah, sorry. The radiation  
13 protection office.

14 MR. SHERBINI: Okay.

15 MR. GALANEK: And we did a whole body count on  
16 him. We ran the urine, and we got some numbers -- some  
17 actual numbers off of him. So we have a front and a back  
18 and a head and a mouth -- a series of measurements with a  
19 Geiger-Mueller detector here.

20 MR. SHERBINI: Okay. Did the urine and blood  
21 samples contain --

22 MR. GALANEK: Yeah, I didn't count the blood  
23 that night. I counted the urine. That's right, it was  
24 about 8,000 dpm/ml.

25 MR. SHERBINI: Okay.

1 MR. GALANEK: I couldn't interpret the whole  
2 body counting data because I had never counted someone with  
3 P-32 inside them before.

4 MR. SHERBINI: Okay.

5 MR. GALANEK: So that was going to take until  
6 next week where I could buy some P-32, calibrate something  
7 with my liquid scintillation counter and then cross  
8 calibrate the whole body counter based on the liquid  
9 scintillation counting results.

10 MR. SHERBINI: So the whole body count was --

11 MR. GALANEK: Yeah, just the first -- because  
12 we have it, and we could measure these x-rays, it was  
13 purely to get some data that night. There was no way we  
14 could generate any quantitative number at that time. We  
15 didn't have the calibration for it.

16 MR. SHERBINI: There was no -- could you tell  
17 roughly what you were looking at in terms of internal  
18 contamination?

19 MR. GALANEK: I couldn't, because I didn't know  
20 at that time enough about P-32. What I knew about P-32 at  
21 that time was that it wasn't a simple excretion, ie. a  
22 tritium or a C-14. I can take 8,000 dpm, multiply it  
23 quickly by 43 liters in standard man, and come up with some  
24 number, but I wouldn't -- (a), give it to anyone; or (b),  
25 know that that was a reasonable number.

1 MR. SHERBINI: Okay. All right, and then after  
2 that, you --

3 MR. GALANEK: I drove Dr. Li back to his  
4 laboratory so he could pick up his personal belongings, all  
5 of his sample bottles, and then we drove to him home in  
6 Medford.

7 MR. SHERBINI: His -- oh, the urine sample  
8 bottles?

9 MR. GALANEK: Yeah, his collection. At  
10 medical, he was given a bunch of sample collection  
11 containers.

12 MR. SHERBINI: Okay. Was he given instructions  
13 on what to do with the samples or how to collect them and  
14 stuff like that?

15 MR. GALANEK: Verbal instruction that he should  
16 collect a sample of each of his voids over the weekend.

17 MR. SHERBINI: Okay. That was provided by the  
18 physician?

19 MR. GALANEK: I think it was provided by me.

20 MR. SHERBINI: Oh, you told him that?

21 MR. GALANEK: Right.

22 MR. SHERBINI: He was to collect each voiding -  
23 - just take a sample of that?

24 MR. GALANEK: Correct, correct. If I -- I  
25 mean, I've learned a lot of lessons from this incident.

1 Next time, person gets one gallon jars and we collect all  
2 24 hour urines. Again, I -- although we've been able to  
3 use the concentration data because of the computer program  
4 that we've used to analyze intake, if there's a primer  
5 written from this incident, a primer should be always  
6 collect 24 hour urines, not just the spot for each time you  
7 void.

8 Because then if you're trying to do total  
9 activity, certainly there's a controversy that arises over  
10 total volume of excretion. Collect everything. And that's  
11 what we changed later that next week. But, you know, I  
12 know the next time I'm called, you get one gallon  
13 containers.

14 MR. SHERBINI: So I guess from that, I surmise  
15 that you don't have emergency bio assay procedures or  
16 procedures for internal intake or for assessment of  
17 internal intakes?

18 MR. GALANEK: That we do not?

19 MR. SHERBINI: Yeah.

20 MR. GALANEK: Correct.

21 MR. SHERBINI: Okay. Okay, then what -- after  
22 Dr. Li got his bottles and everything --

23 MR. GALANEK: Off we went.

24 MR. SHERBINI: To his place?

25 MR. GALANEK: To his house. I surveyed the

1 floor area, the carpeted area, as I recall. He had a pile  
2 of his laundry -- I surveyed that, did not find any  
3 contamination. I surveyed the -- all the floor area into  
4 the bathroom. I surveyed the toilet, under the toilet  
5 seat, thinking maybe he was not good at aim and I might  
6 find some contamination there. I surveyed his toothbrush.  
7 There were two toothbrushes there. I surveyed both of  
8 them.

9 I surveyed a towel, washcloths, no  
10 contamination. It was a -- in the kitchen area, there was  
11 a pile of bottles that, if my memory serves me, was sort of  
12 like returnable bottles. I surveyed in there. No  
13 contamination.

14 MR. SHERBINI: Okay. All right, then --

15 MR. GALANEK: I went home.

16 MR. SHERBINI: You went home? Were there any  
17 instructions to Dr. Li on what to do or --

18 MR. GALANEK: Just to collect the urine and we  
19 would see him on Monday.

20 MR. SHERBINI: Monday? Okay. Was there any  
21 consideration of -- since that point, you said earlier that  
22 you did not know how much intake was involved in this, was  
23 there any consideration to prophylactic action, taking any  
24 chelating agents or whatever?

25 MR. GALANEK: I did not give that a

1 consideration.

2 MR. SHERBINI: Okay. Did you believe at that  
3 time that the intake was relatively small or relatively  
4 large?

5 MR. GALANEK: I would say I thought the  
6 intake -- I talked with Frank Masse when we -- I guess  
7 I've left out part of the story thinking about it. But  
8 while we were at the counting room, I called Frank at home,  
9 told him about the 8,000 dpm, and we were saying -- you  
10 know, we're probably looking at somewhere in the 100-200  
11 microcurie range, not -- you know, a couple of microcuries.

12 But we -- you know, there was no way to place a  
13 handle on it at that time. My judgement in this case was  
14 it seemed like it was not something that had been taken  
15 that day. And so, I -- you know, prophylactically, I  
16 wouldn't know what to have prescribed to him.

17 MR. SHERBINI: But your estimate at that time  
18 was 100 to 200 microcuries?

19 MR. GALANEK: That's just in a conversation  
20 between Frank and I. There's no other -- it was just based  
21 on 8,000 dpm. And if in fact it were throughout the body  
22 water, that I think comes out -- I haven't done this  
23 recently, but maybe that night I did it and it was 150 or  
24 140 microcuries, something along that line.

25 But I also knew it couldn't be right, because I



1 know that 30% of it goes to the bone. And so, I still  
2 assumed we were talking about that and not some level much  
3 greater.

4 MR. SHERBINI: Okay.

5 MR. GALANEK: Also, at that time, there's no  
6 evidence to me that -- the only evidence I can see is maybe  
7 somehow the researcher has got this inside of him. And he  
8 tells me that from in the past week he's not handled more  
9 than 150 microcuries of radioactivity.

10 MR. SHERBINI: Yeah.

11 MR. GALANEK: So, makes some sense that night.

12 MR. SHERBINI: That what?

13 MR. GALANEK: That, you know, if he handled 100  
14 microcuries, it wasn't going to be -- or 150 microcuries  
15 total, it wouldn't be much more than that -- qualitatively.

16 MR. SHERBINI: I see. Was Dr. Li told where he  
17 stood at that time -- how much activity he had in him?

18 MR. GALANEK: No, he was not.

19 MR. SHERBINI: Okay. Okay, so that was  
20 Saturday night?

21 MR. GALANEK: Right.

22 MR. SHERBINI: And you saw Dr. Li next on  
23 Monday?

24 MR. GALANEK: Monday. He brought in all the  
25 urine samples. I, in my mind, can't resolve this one,

1 whether it was Monday or Tuesday, but I think it was Monday  
2 when he brought in his laundry cataloged by day for me to  
3 measure again.

4 MR. SHERBINI: Okay.

5 MR. GALANEK: And --

6 MR. SHERBINI: Was he asked to do that or he  
7 did it on his own?

8 MR. GALANEK: No, no, he did it on his own.

9 MR. SHERBINI: Okay.

10 MR. GALANEK: He had, I guess, taken his geiger  
11 counter from the lab on Sunday, gone home and did a more  
12 careful measurement and could find these droplets of urine  
13 in his underpants.

14 MR. SHERBINI: Okay.

15 MR. GALANEK: So he brought that in so we could  
16 confirm, I guess, his measurements.

17 MR. SHERBINI: Okay. And did you confirm --

18 MR. GALANEK: Yeah, yeah.

19 MR. SHERBINI: Okay, there was activity?

20 MR. GALANEK: Yeah, in fact, based on his  
21 cataloging of his daily clothing is why we believe the  
22 intake to have been on Monday the 14th.

23 MR. SHERBINI: At what point did you realize  
24 that it was P-32 that you were dealing with?

25 MR. GALANEK: That night. I mean, -- well,

1 it's a little -- research had told me -- Dr. Li had told me  
2 he only worked with P-32. He has something coming from all  
3 over this body, and I'm assuming that it's P-32  
4 Bremstrahlung x-rays. When I sit him down in the whole  
5 body counter, I do know what that's going to look like. It  
6 kind of looks like it's a Bremstrahlung spectra.

7           The liquid scintillation counter is the  
8 protocol that we counted the samples on will take the most  
9 appropriate efficiency curve based on the energy spectra  
10 that it's seeing, and it used the P-32 curve. So those are  
11 the things that led me to believe -- he told me he works  
12 with P-32, and then the whole body, and the urine analysis.

13           MR. SHERBINI: Okay. So Monday you surveyed  
14 his underwear and conductivity and you took his urine  
15 samples?

16           MR. GALANEK: Correct.

17           MR. SHERBINI: Okay. And were these counted  
18 then?

19           MR. GALANEK: Yeah.

20           MR. SHERBINI: What were the conclusions from  
21 this?

22           MR. GALANEK: I don't think on Monday there was  
23 still any conclusions of activity.

24           MR. SHERBINI: Okay, the urine samples were not  
25 sufficient to --

1           MR. GALANEK: Well, the urine samples were --  
2 the data was difficult unless we averaged everything. I  
3 mean, we were starting to look at this data. Dr. Li, I  
4 guess, spent the day Sunday in the library and brought us a  
5 proceedings from ICRP 30 -- not the ICRP 30, but a  
6 proceedings about it after it went into effect in 1980 and  
7 that said okay, days post on intake -- this is what we  
8 might expect in the urine.

9           MR. SHERBINI: Okay.

10          MR. GALANEK: So we were trying to use that and  
11 some interpolation of data to see if we could come up with  
12 a number for his intake. In addition, we did a -- I did a  
13 quick calibration of the whole body counter based on some  
14 P-32 that I borrowed from a laboratory. And again, had  
15 some result that at that point was showing somewhere less  
16 than 200 microcuries.

17          MR. SHERBINI: Based on whole body counter?

18          MR. GALANEK: Right.

19          MR. SHERBINI: Okay, but the urine data, you  
20 said, did not provide you with any definite number? That's  
21 basically what I understand.

22          MR. GALANEK: Yeah, not until Tuesday night  
23 were we using -- I believe it was on Tuesday that the urine  
24 provided us with -- where we were trying to make some --  
25 that we thought we had some numbers from the urine.

1 MR. SHERBINI: What changed from Monday to  
2 Tuesday? Any --

3 MR. GALANEK: Knowing more about P-32 by then.

4 MR. SHERBINI: Oh, okay. So I guess the  
5 situation is that you -- you didn't have a protocol for  
6 handling P-32 intakes?

7 MR. GALANEK: Correct.

8 MR. SHERBINI: Either using urinalysis or using  
9 whole body counter?

10 MR. GALANEK: Right, we did not have a protocol  
11 to assess an intake based on a couple of measurements from  
12 P-32 by whole body counting. Well, whole body --

13 MR. SHERBINI: Or urinalysis?

14 MR. GALANEK: Right.

15 MR. SHERBINI: Is there a protocol for other  
16 nuclides that people might ingest here?

17 MR. GALANEK: No.

18 MR. SHERBINI: Okay. A related question,  
19 because we need to ask later, but maybe I should ask now.  
20 What is the frequency of contamination here on the campus?  
21 Let's say -- let's go back five years or so.

22 MR. GALANEK: Internal?

23 MR. SHERBINI: Both external and internal. How  
24 many people get contaminated, say a year -- over the past  
25 five years, externally or internally? Just a rough --

1 we'll get the records later, but just a rough idea.

2 MR. GALANEK: Ten internal, two a year.

3 Thyroid typically.

4 MR. SHERBINI: Okay. How about isotopes?

5 MR. GALANEK: Typically I-125.

6 MR. SHERBINI: Okay. No P-32 internals before?

7 MR. GALANEK: No.

8 MR. SHERBINI: So no contaminations?

9 MR. GALANEK: You know, one a year. I just am  
10 not -- we can look in our records. Very infrequent.

11 MR. SHERBINI: Okay, so we're I guess down to  
12 Tuesday night when you had some better handle on what  
13 intake was involved here?

14 MR. GALANEK: Right.

15 MR. SHERBINI: What happened after that? Did  
16 you change the urine collection protocol? Was Dr. Li given  
17 different instructions on --

18 MR. GALANEK: The -- no, I don't believe that  
19 happened until Wednesday that we -- no, I guess he started  
20 to collect 24 hour urines on Tuesday, but we didn't have a  
21 system down to make the 24 hour urine collection clear how  
22 we wanted it. We didn't give him any written procedure to  
23 say okay, you started the first time when you last void,  
24 that's the start of your next container of urine.

25 So there was some controversy for a couple of

1 days when was the starting period of the next 24 hours  
2 versus the stopping point of the last void. That was  
3 finally ironed out on Wednesday, I believe. And then after  
4 that, we had noon to noon samples for the next however many  
5 weeks.

6 MR. SHERBINI: Okay. The final number was -- I  
7 think I saw 500, 600 microcuries is your best estimate of  
8 the intake?

9 MR. GALANEK: Correct.

10 MR. SHERBINI: Could you give me some idea of  
11 what kind of specific activity you were talking about here  
12 in the liquid that Dr. Li was working with? Do you have  
13 this data?

14 MR. GALANEK: No, I do not.

15 MR. SHERBINI: No? Okay. Who might have this?

16 MR. GALANEK: I can get that.

17 MR. SHERBINI: Okay, yeah. I'd like -- we'd  
18 like to know what the container looks like -- how they get  
19 it, what shape.

20 MR. GALANEK: Yeah, it's the NEN Com V vial.

21 MR. SHERBINI: I'm not familiar with this.

22 MR. GALANEK: Okay, yeah; we can get you an  
23 example of that. Basically it would hold one and a half  
24 milliliters.

25 MR. SHERBINI: Okay, so it's about what? Two



1 centimeters high?

2 MR. GALANEK: Yeah, yeah, it's -- I don't know,  
3 four centimeters in diameter or so.

4 MR. SHERBINI: Okay.

5 MR. GALANEK: Red cap, it -- my guess is it  
6 might be a millicurie per 100 microliter type of  
7 concentration.

8 MR. SHERBINI: Okay. Microliter?

9 MR. GALANEK: Right. Well, one millicurie per  
10 100 microliter. That's a typical type of concentration.

11 MR. SHERBINI: Would this information be on the  
12 shipping documents or receipt documents?

13 MR. GALANEK: It would be on the technical data  
14 sheet that --

15 MR. SHERBINI: Okay, would that be kept in your  
16 office or --

17 MR. GALANEK: No, that goes to the researcher  
18 for their use.

19 MR. SHERBINI: So we get it from Dr. King  
20 maybe?

21 MR. GALANEK: Yeah, in fact, I've -- in your  
22 request for documentation, I'm asking them to send over the  
23 original purchase order for the samples. Because in fact,  
24 this lab has some of their orders on a -- what we call a  
25 standing order that every Monday a certain quantity of

1 radioactive material is shipped to us.

2 MR. SHERBINI: Okay. Okay, I think I -- I  
3 don't have any more questions right now on these lines,  
4 except I would like to request that -- I'd like to see the  
5 whole body counter and --

6 MR. GALANEK: Oh, yeah, okay.

7 MR. SHERBINI: -- your survey instruments and  
8 your liquid scintillation counter. So whenever we can  
9 arrange it.

10 MR. GALANEK: Okay.

11 MR. SHERBINI: And description of how they're  
12 operated and I've also requested documents on the  
13 procedures for using these instruments.

14 MR. GALANEK: Right.

15 MR. SHERBINI: The whole body counter, I  
16 understand you don't normally use for anything --

17 MR. GALANEK: Well, we -- because we have a  
18 reactor, if there's an incident or on a routine basis, we  
19 will have people come in and we do an annual whole body  
20 count. What we don't do is we don't see anything in  
21 anyone.

22 MR. SHERBINI: Right.

23 MR. GALANEK: And then, you know, we don't have  
24 any routine whole body counting for any projects right now.  
25 We certainly don't routine whole body count for P-32. It

1 just happens to be a tool because the type of whole body  
2 counter was developed here. So we have the prototype.

3 MR. SHERBINI: Is there a routine urinalysis or  
4 random urinalysis?

5 MR. GALANEK: Not for phosphorous-32. It would  
6 be --

7 MR. SHERBINI: For any isotope?

8 MR. GALANEK: Tritium. Tritium we are required  
9 to have routine urinalysis. There's a couple of  
10 laboratories that handle significant quantities of sulphur-  
11 35, and we will require urine samples after they've handled  
12 those quantities.

13 MR. SHERBINI: Okay.

14 MR. GALANEK: But most would be an accident or  
15 incident situation where someone has found contamination in  
16 the laboratory and we're trying to assess if there is  
17 anything inside them.

18 MR. SHERBINI: Okay. Okay, I don't have any  
19 further questions. Is there anything else you think you  
20 should -- you would like to say or you would like to add to  
21 what you have said before?

22 MR. GALANEK: No, I think as we went through  
23 this, we certainly learned a lot about P-32. We learned  
24 more about trying to assess intake from P-32. It wasn't  
25 easy over those first few days, and I guess if we all

1    become better at that from this, --

2                   MR. SHERBINI:  In terms of activity, is that  
3    one of the highest quantity activity used per year, say, on  
4    campus?

5                   MR. GALANEK:  It's the most frequent  
6    radionuclide used.  We have a lot of research in molecular  
7    biology, and it certainly is -- I would say if we rank  
8    ordered the radionuclides being used, probably 60% of our  
9    packages -- you know, shipments that arrive, are  
10   phosphorous-32.

11                  MR. SHERBINI:  Does that reflect also the  
12   activity that is received per year, say, of that isotope or  
13   not?

14                  MR. GALANEK:  No, because one shipment of  
15   tritium as tritiated water will knock that right out.

16                  MR. SHERBINI:  Right, okay.

17                  MR. GALANEK:  But people tend to work with more  
18   sulphur-35 than P-32 activity wise.

19                  MR. SHERBINI:  Okay.

20                  MR. GALANEK:  So they tend to work in  
21   millicurie quantities with sulphur-35 doing the same --  
22   some of the same type of molecular biology experiments  
23   where, because the manufacturers do most of the labeling  
24   today, the P-32 activities -- most shipments have 250  
25   microcuries or multiples there are if they need different

1 of the nucleotide triphosphates.

2 MR. SHERBINI: Okay. So what you're saying is  
3 there fewer people handling sulphur-35, but in larger  
4 quantities -- larger activities; where there are a lot more  
5 P-32 users?

6 MR. GALANEK: No, probably they're one in the  
7 same people actually. Sure, sure. We use P-32, sulphur-  
8 35, iodine-125, tritium, chromium-51, and C-14 as sort of  
9 our big six. P-33 has had some in roads in the last couple  
10 of years. Low beta energy -- thus, they don't want to use,  
11 as they call, the dangerous -- the advertisers don't want  
12 you to use the dangerous P-32. Factor of ten more of cost  
13 for P-33, but they have -- some researchers have a lot of  
14 requests for P-33 use over the last say year and a half or  
15 so.

16 But those are sort of the big six or seven that  
17 98% of our work is involved with.

18 MR. SHERBINI: Okay. And these are -- they're  
19 all almost all beta emitters?

20 MR. GALANEK: Yeah, chromium and iodine being  
21 the X gamma emitters. The rest are low energy beta  
22 emitters except for the P-32.

23 MR. SHERBINI: Okay, okay.

24 MR. ROBINSON: I've got a couple of questions.  
25 Mitch, did -- I may have not understood correctly, but did

1 you say that you do or do not issue any type of a little  
2 procedure manual to your project people as to what actions  
3 to take in case of contamination?

4 MR. GALANEK: We have our required procedures  
5 for radiation protection, which is part of our application  
6 for license to the NRC.

7 MR. ROBINSON: Okay.

8 MR. GALANEK: Every worker gets that along with  
9 some information sheets during their training session.

10 MR. ROBINSON: Okay, and then would there be  
11 something in that that would give them some guidance as to  
12 what to do if they suddenly discovered they were  
13 contaminated?

14 MR. GALANEK: I believe the first statement is  
15 call 100.

16 MR. ROBINSON: Okay, okay. When you went to  
17 Dr. Li's apartment on Saturday night and surveyed, as you  
18 described it, the pile of laundry -- I mean, do you recall,  
19 was that -- was the underwear contained in that pile of  
20 laundry, or did you notice that?

21 MR. GALANEK: Not looking for it, I didn't  
22 notice it. But my guess is yes.

23 MR. ROBINSON: And when he brought the  
24 underwear in and you confirmed his readings on the  
25 underwear, if that underwear had been intermingled in that

1 pile of laundry, would you have expected not to receive the  
2 same type of confirmatory readings that -- in other words,  
3 you didn't notice any high activity on Saturday night?

4 MR. GALANEK: Right. Again, and the activity  
5 isn't that high on the underwear.

6 MR. ROBINSON: Okay.

7 MR. GALANEK: If there's another lesson learned  
8 for me, is if I'm ever faced with a situation like this  
9 again, I check people's underwear, especially I guess a  
10 male, for droplets of urine.

11 MR. ROBINSON: Well, I'm not necessarily  
12 talking about a lesson learned.

13 MR. GALANEK: And that would be for me.

14 MR. ROBINSON: Okay.

15 MR. GALANEK: Is if I'm faced in a situation  
16 like this again, that's one of the first things -- that  
17 would be an article of clothing I would be looking at more  
18 closely. I can tell you that in him bringing in his  
19 underpants for me to confirm his surveys, you cannot  
20 measure any P-32 until you look for discoloration and this  
21 dot that you put your Geiger-Mueller detector over, and  
22 then you find it.

23 So it --

24 MR. ROBINSON: Okay.

25 MR. GALANEK: Could I have found that at his



1 apartment that night? If it happened this Saturday,  
2 absolutely. Because I know what I'm looking for. With the  
3 readings I was getting from him, I would have assumed that  
4 I could find something giving me a significant reading, not  
5 I was going to look and find a little discoloration on a  
6 pair of underpants.

7 MR. ROBINSON: Right.

8 MR. GALANEK: So that's -- and I've got to tell  
9 you that the first pair of underpants he put down, I wasn't  
10 sure why he had brought these in catalogued by day. And  
11 so he said I want you to survey these. So we did his t-  
12 shirt. I found nothing. And I went over this -- I got to  
13 tell you, the first one, I didn't find anything. He said  
14 you have to try again.

15 Of course, when he came near me, I'm getting --  
16 I said you've got to stand over here. And then I  
17 understood what he was trying to tell me. And surer than  
18 hell, I mean, you look and there's a spot of discoloration.  
19 So I could see the radioactivity, and then it was easy for  
20 the next five pair of pants that he brought in or whatever  
21 catalogued by the week, I knew what to look for as I was  
22 going with that Geiger-Mueller.

23 MR. ROBINSON: When you say catalog, had he  
24 physically written dates on them?

25 MR. GALANEK: Correct. He had bags of clothing

1 that he had cataloged as Saturday, Sunday. And he said he  
2 didn't know which day they were. And then Monday, Tuesday,  
3 Wednesday, Thursday, Friday, and I believe Saturday,  
4 Sunday again. And it was that Monday's that we first can  
5 detect the P-32 and then the subsequent days.

6 MR. ROBINSON: And what was done with that  
7 clothing after you confirmed his readings? Did he take it  
8 home or --

9 MR. GALANEK: Actually he did. Another lesson  
10 -- I probably should have kept his underpants and -- I  
11 wouldn't have laundered them. I would have let them decay.

12 MR. ROBINSON: And he didn't write -- I mean,  
13 he's just writing on the bags. He's writing the labeling  
14 on the bags or is he physically writing it on the clothes?

15 MR. GALANEK: No, he had bags that had --

16 MR. ROBINSON: Labels of the dates?

17 MR. GALANEK: -- Magic Marker written what the  
18 day and the date was.

19 MR. ROBINSON: Okay.

20 MR. SHERBINI: Before we leave this point,  
21 could you see any change in activity from day to day on the  
22 --

23 MR. GALANEK: Yeah, we do.

24 MR. SHERBINI: If you could please --

25 MR. GALANEK: I'll request that, but I will put

1 it even with the urine data. I'll put -- I have that data.

2 MR. SHERBINI: But you could see a trend up or  
3 down?

4 MR. GALANEK: No, it's hard to tell. As I  
5 recall, -- I don't. I'd have to look at it again. What  
6 the trend is is there is none in what he has cataloged on  
7 Saturday and Sunday. And then there is Monday, there is  
8 Tuesday, there is Wednesday. But for me, I've always  
9 assumed that it was qualitative as best to give some sort  
10 of a starting point.

11 MR. ROBINSON: When you met Dr. Li over at the  
12 medical treatment area, I guess with Dr. Hajjar or --

13 MR. GALANEK: Right, Roger Hajjar, H-A-J-J-A-R,  
14 I believe. What was Dr. Li's demeanor at time? By  
15 demeanor, I mean, was -- did he appeared worried or angry  
16 or how did he appear to you?

17 MR. GALANEK: I didn't get any sense of any  
18 demeanor.

19 MR. ROBINSON: Okay. Did he talk much? Did he  
20 volunteer much information about what was happening, or was  
21 he just kind of standing there receiving all the tests that  
22 were being done on him?

23 MR. GALANEK: I mean, we had some conversation  
24 again as to what he had worked with, did he have an idea of  
25 how or when this has happened to him. I don't recall

1 anything more than that. I do recall him saying that he  
2 had worked with 50 microcuries that day and had worked in  
3 the laboratory. And that -- I said well, we'll have to go  
4 and see what's in the laboratory.

5 MR. ROBINSON: Okay. And I heard you  
6 explaining to Sami about the activity in one of those vials  
7 that usually contains the P --

8 MR. GALANEK: P-32.

9 MR. ROBINSON: If someone were to take one of  
10 those vials and pour it on food and someone were to eat  
11 that food, what levels of -- within a period of two or  
12 three days, what levels of activity would you expect to see  
13 in the urine? I mean, I don't have -- I'm just asking.

14 MR. GALANEK: No, I -- I guess I don't  
15 understand something you're asking too.

16 MR. ROBINSON: If somebody would have just  
17 pulled one of those vials out of --

18 MR. GALANEK: And just poured --

19 MR. ROBINSON: -- and poured it on some food,  
20 and whatever is contained in those vials, and that person  
21 would have unknowingly ingested that, and you would have  
22 taken a urine sample, let's say a week later or five days  
23 later, I know you said there were some 8,000 dpm's per  
24 milliliter in his -- what would you expect to see in --  
25 this is a hypothetical person.

1                   Is that -- I mean, is that an unbelievable  
2 amount to have ingested, or is that enough to produce 8,000  
3 dpm?

4                   MR. GALANEK: Oh, it would produce -- in five  
5 days, certainly. The millicurie would produce 8,000 and  
6 some --

7                   MR. ROBINSON: More than that?

8                   MR. GALANEK: Don't know.

9                   MR. ROBINSON: Okay, I'm just trying to get a  
10 feel for --

11                  MR. GALANEK: I under -- right. And  
12 unfortunately, or maybe fortunately, the way we first  
13 collected -- it just depends on how your voiding system is.  
14 Now, I guess if you drink two six packs of Diet Coke a day  
15 because that's your intake of fluids, maybe you're going to  
16 pee a lot. I'm somewhat of a coffee drinker at times in  
17 the morning, and I find that I'm running to the men's room.

18                  Well, if I keep running every hour, we may have  
19 an hour where we don't find many dpm's in the urine. And  
20 in fact, in this case, that's what happened. Dr. Li took  
21 it upon himself to hydrate himself. And -- at least I  
22 believe. He didn't take it at my -- I did not tell him to  
23 increase fluid intake. But I know that he decided that.  
24 That's what he told me on Monday.

25                  So we have urine samples that go from 11,000

1 dpm/ml to background because he pees an hour later. So  
2 subjectivity, you know, if it's standard person and they're  
3 going to eliminate 1,400 ml a day, then maybe that number  
4 could actually almost be in a chart.

5 But without knowing something about a person,  
6 I'm not expert enough to take one number and put a -- and  
7 then be able to say gee, five days ago you got a  
8 millicurie. I do not have that expertise. Although, I  
9 think --

10 MR. ROBINSON: I mean, does anyone have that  
11 expertise?

12 MR. GALANEK: You know, with what we've learned  
13 from this and in -- if this happened -- if something  
14 happened again similar to this and we had some idea, I'd  
15 say we could come damn close within a day or two. Maybe  
16 not one measurement, but with one or two 24 hour  
17 measurements, I'd say we'd come real damn close now.

18 MR. ROBINSON: Let's -- I'm just investigating  
19 the possibility of any relations to the external surveys of  
20 the body. If -- can you relate that to an amount ingested  
21 at all over a period of time? In other words, if that same  
22 hypothetical person had ingested one of those vials, would  
23 he be getting -- a week later, would he be getting the bone  
24 readings at the skull and the knee that --

25 MR. GALANEK: Again, I think that some of the

1 things that we look to use the data for is to try to  
2 project something like that. Let's take a hypothetical  
3 person and they've ingested a millicurie. If in fact our  
4 calculations are correct for Dr. Li, we have some excellent  
5 data now that should be used, and you can come up with a  
6 chart, I think, and say okay --

7 I don't recall these numbers exactly, but they  
8 used to do it for neutron exposure. If someone got hit  
9 with a blast of neutrons, you bent them over a geiger  
10 counter, and for every millirad per hour you could measure,  
11 you could say that it was so many neutrons they got exposed  
12 to. I believe that we could do something like this with  
13 the data we've collected.

14 MR. ROBINSON: Okay.

15 MR. GALANEK: The question is could I have done  
16 it then? My answer is no. And I'm --

17 MR. ROBINSON: Okay, I'm not looking for that.

18 MR. GALANEK: No, I'm just --

19 MR. ROBINSON: What I'm looking for is to see  
20 if we have somebody that deliberately contaminated either  
21 Mr. Li's drinking water or his food or something, are they  
22 going to have to take four or five of these vials, or are  
23 they going just have to take a couple of drops out of one  
24 of those vials?

25 MR. GALANEK: You know, the amount of activity



1     that we're estimating Dr. Li ingested is one drop.

2                   MR. ROBINSON: One drop?

3                   MR. GALANEK: One drop is 50 -- rule of thumb  
4     is that there are 20 drops in a milliliter.

5                   MR. ROBINSON: Okay.

6                   MR. GALANEK: If you take an eyedropper and you  
7     dropped 20 times, it should come up to one milliliter in a  
8     graduate. 1/20th of that, 50 microliters, one drop. And  
9     that's the kind of specific activity they're dealing with.  
10    It might be less than a drop depending on the date of the  
11    assay. See, the suppliers like to beat each other to  
12    market, so they -- you order a millicurie, they send you  
13    1.4 millicuries.

14                   And they just give you an assay date of several  
15    days later. So, I think again we're looking at something  
16    in, you know, 50 microliter type.

17                   MR. ROBINSON: So if I'm hearing you right, if  
18    this person took one drop out of that vial and put it on  
19    the food, he could be getting the kind of readings that Dr.  
20    Li was getting?

21                   MR. GALANEK: Correct.

22                   MR. ROBINSON: Okay, okay.

23                   MR. GALANEK: One of the numbers that I would  
24    wonder that -- been trying to say when this intake may have  
25    happened, if you take 500 microcuries of P-32 and you now

1 have this sort of in a monolayer in your mouth, there's one  
2 hell of a dose rate coming from that. You know, tens of  
3 thousands of millirads per hour beta. And it can't -- you  
4 know, so I don't know how we missed this also in -- we, the  
5 people surveying themselves in the lab, when this happened.

6 That's one thing that you can think about.

7 MR. SHERBINI: Are they required to survey?

8 MR. GALANEK: Every time they use radioactive  
9 material, they are trained that they have to survey  
10 themselves and the laboratory.

11 MR. SHERBINI: Their entire body or just their  
12 hands?

13 MR. GALANEK: We require that people wear  
14 gloves and a lab coat, and that they survey themselves  
15 after they work with radioactive material.

16 MR. SHERBINI: But would they not survey their  
17 mouth -- say to open their mouth and survey?

18 MR. GALANEK: That's my point, is that --

19 MR. SHERBINI: Or even if --

20 MR. GALANEK: If I got near a geiger counter  
21 with my hands and my mouth had a half a millicurie in it, I  
22 don't know how I would miss -- I don't -- I think it's  
23 something that's going to -- if someone is a careful,  
24 astute worker, a very fastidious -- maybe -- I'm not going  
25 to get in that. It's just purely opinion, but I'm -- I

1 just think that if I'm a radiation worker and I had this  
2 much in my mouth and it was during a time that I was  
3 working with radioactive material and actively surveying  
4 myself, I think I would have seen it.

5 But I don't have numbers to show you that.

6 MR. ROBINSON: Well, let's say that you're that  
7 worker and you eat your lunch and it has it on that, and  
8 you leave the lab at 3:00 that night and survey yourself  
9 before you leave, would you still expect that -- I mean,  
10 that kind of area around the mouth -- I mean, that kind of  
11 activity?

12 MR. GALANEK: No, probably some of it has --

13 MR. ROBINSON: Well, I mean, a noticeable -- in  
14 other words, if you're going to survey yourself in a normal  
15 -- just do your hands, because that's where you think it  
16 might be, and you get that instrument even within a foot  
17 or a foot and a half of the mouth, it's going to come?

18 MR. GALANEK: You're going to see it. I  
19 believe you are. And I can --

20 MR. ROBINSON: Okay.

21 MR. GALANEK: In fact, these are some of the  
22 things out of this when I have some time that I would like  
23 to do with some P-32 to make such measurements.

24 MR. ROBINSON: So if in fact the ingestion date  
25 was Monday the 14th, if -- according to your logic, if Dr.

1 Li had surveyed himself at the end of his activity that day  
2 and had ingested even a drop of P-32, --

3 MR. GALANEK: If he had ingested what we  
4 believe to be his intake, which is between 500 and 600  
5 microcuries, I believe that he would have -- I think you  
6 would see that on a survey if you have this Geiger-Mueller  
7 detector and you're measuring yourself.

8 MR. ROBINSON: And even if you're not measuring  
9 -- specifically measuring your mouth or your head and --

10 MR. GALANEK: No, I think you have to be in  
11 some close enough proximity to the geiger counter to be  
12 able to see it.

13 MR. SHERBINI: Well, the surveys, are they  
14 required to survey themselves every time they leave the lab  
15 or only when they work with radioactive material?

16 MR. GALANEK: Only when they have handled  
17 radioactive material.

18 MR. SHERBINI: Okay. So if he -- if this stuff  
19 was in his lunch on a day when he did not work with  
20 radioactive material, he would not survey himself?

21 MR. GALANEK: Correct.

22 MR. SHERBINI: Okay.

23 MR. GALANEK: Unless some of the -- when you  
24 request finally our dose calculations, one of the meals he  
25 has is at noon. I thought he told us one of the meals he

1 has later in the day is at 8:00. And so, again, some of --  
2 we're basing it on a noon intake. But if he takes in a  
3 half a millicurie at noon and he works the rest of the day  
4 and surveys himself, we think he might be able to see that.

5           Whereas, if he has it in his final meal of the  
6 day and doesn't work now until the following Saturday with  
7 radioactive material, which that's what he was told us was  
8 his schedule, then in fact the intake happens later in the  
9 day. And even if we play with out computer program, the  
10 error becomes smaller and smaller because we get later in  
11 the day for intake.

12           So -- and I know you're somewhat of an expert  
13 and the person who is doing this stuff for us will talk  
14 with him -- Bill Irwin about it, but you know, it makes  
15 some difference in final intake, eight or ten hours or 12  
16 hours that initial day.

17           MR. ROBINSON: Well, and you know, obviously we  
18 could think up a lot of different possible scenarios here.

19           MR. GALANEK: Sure, sure.

20           MR. ROBINSON: And I just wanted to get a feel  
21 for the amount of the P-32 that it would take to get those  
22 kinds of levels and also -- I appreciate your comment about  
23 the immediate activity to the mouth right after -- let's  
24 say he had not been working with radioactive material that  
25 day at all, and someone else had contaminated his food.

1           Would he receive any kind of a -- I mean,  
2   burning sensation or --

3           MR. GALANEK: Not that I'm aware of at levels  
4   of this activity.

5           MR. ROBINSON: Okay. Just to clarify in my  
6   mind who was where at different times, when you met at the  
7   med center, it was you and Tom Lynch?

8           MR. GALANEK: No.

9           MR. ROBINSON: No?

10          MR. GALANEK: No, Tom Lynch never -- Tom Lynch  
11   was the original contact --

12          MR. ROBINSON: Oh, okay.

13          MR. GALANEK: -- on the EMS on call. Tom  
14   called my house, got my wife.

15          MR. ROBINSON: Okay.

16          MR. GALANEK: Tom also called for Don Haes, and  
17   Don Haes is the other person who reported with me. Don  
18   Haes is an assistant radiation safety officer.

19          MR. ROBINSON: So it was you, Don Haes, Dr.  
20   Hajjar, and Dr. Li?

21          MR. GALANEK: Correct. And there's a woman  
22   Eileen, I think, that runs the front desk. But we are -- I  
23   believe her name is Eileen.

24          MR. ROBINSON: Was the MIT campus policeman  
25   there too when you got there?

1 MR. GALANEK: No.

2 MR. ROBINSON: Okay.

3 MR. GALANEK: We did a reactor drill, and  
4 sometimes in my mind I'm seeing the campus police bringing  
5 this kid in, but I'm fairly certain there was no campus  
6 policeman there. It was Roger, Don, myself, and Li.

7 MR. ROBINSON: Okay. And then when you came  
8 back over to his lab, --

9 MR. GALANEK: What do they say about short term  
10 memory loss?

11 MR. ROBINSON: When you came back over to his  
12 lab, it was just Dr. Li, you and Haes?

13 MR. GALANEK: Correct.

14 MR. ROBINSON: And then when you came back over  
15 here, was Haes still with you?

16 MR. GALANEK: Correct.

17 MR. ROBINSON: Anybody else over here?

18 MR. GALANEK: No.

19 MR. ROBINSON: And then when you went to his  
20 apartment, was Haes still with you?

21 MR. GALANEK: No.

22 MR. ROBINSON: Just you and Li and Li's wife  
23 when you got to the apartment?

24 MR. GALANEK: Li's wife was not home.

25 MR. ROBINSON: She was not home?



1           MR. GALANEK: In fact, he stated to me it's  
2 best we go when my wife's not home. She's actually coming  
3 into MIT to get me. I guess they have just one car.

4           MR. ROBINSON: Okay.

5           MR. GALANEK: And it sounded kind of good at  
6 that point that if in fact he hasn't -- you know, -- see, I  
7 don't know the police report that she already knows he's  
8 radioactive. I know that know because they send me the  
9 report the next week. But it sounded -- I put myself in  
10 people's situations. If I was going home to find  
11 something, I'd rather find it and then tell my wife than  
12 have sort of a scene and then deal with it accordingly  
13 after that.

14          MR. ROBINSON: And the --

15          MR. GALANEK: I've never met his wife.

16          MR. ROBINSON: Okay. And at the medical  
17 treatment center, the rinsing of the mouth, was Dr. Hajjar  
18 doing that kind of at your -- had you talked to Dr. Hajjar  
19 before you went?

20          MR. GALANEK: Correct.

21          MR. ROBINSON: Your suggestion to do the  
22 rinsing of the mouth?

23          MR. GALANEK: Correct, correct.

24          MR. ROBINSON: Okay.

25          MR. SHERBINI: Did the doctor suggest anything

1 else that Dr. Li might do?

2 MR. GALANEK: Not in my presence.

3 MR. SHERBINI: Okay.

4 MR. GALANEK: And I can tell you one of the  
5 things that I thought about -- I don't have a car phone,  
6 but as I was driving up, I was thinking all right, what am  
7 I going to do. And I would have had them cause him to  
8 vomit and try to empty the content of his stomach if there  
9 was a positive reading on the mouthwash.

10 But you know -- and this is just my action.  
11 Seeing that this was completely through him, that is why I  
12 didn't have that done. But had it been positive, then I  
13 would have caused -- had them cause him to vomit to get  
14 anything out that was in his stomach.

15 MR. SHERBINI: Do you have a medical expert  
16 who's name is written down somewhere that you could call in  
17 case that you need such information?

18 MR. GALANEK: For radiation emergencies?

19 MR. SHERBINI: Yeah, what to do if somebody  
20 swallows something or -- yeah.

21 MR. GALANEK: No.

22 MR. SHERBINI: Okay.

23 MR. ROBINSON: Just a couple questions back in  
24 the ordering and shipping of the material now. If  
25 researcher A over in Dr. Tonegawa's lab orders a quantity

1 of material, does researcher A have to pick it up, or can  
2 any authorized user from the lab pick it up, or do you  
3 deliver it, or how's that done again?

4 MR. GALANEK: We deliver it to the laboratory.

5 MR. ROBINSON: To the laboratory?

6 MR. GALANEK: Right. And if researcher A who  
7 ordered it -- well, in the case of the Toneyawa laboratory,  
8 they have a standing order for several people to use. So  
9 any one of them can sign for that package, and any one of  
10 them can thus use that material.

11 MR. ROBINSON: Roughly how many vials of P-32 a  
12 week go over there? Can you give me a rough estimate?

13 MR. GALANEK: I just -- my guess is between  
14 three and five, but I can -- we can knock that out of the  
15 computer very easily for you.

16 MR. ROBINSON: Okay.

17 MR. GALANEK: I can give you that.

18 MR. ROBINSON: Okay. Yeah, I'd like to know  
19 over a given period of time how many of those vials go in  
20 there.

21 MR. GALANEK: Sure.

22 MR. SHERBINI: Would that include the activity  
23 for each?

24 MR. GALANEK: Sure.

25 MR. SHERBINI: Okay.

1           MR. GALANEK: See, what I have to -- the part  
2 I'm not just clear on right now is they get, say a two  
3 millicurie shipment, and that's why I need to look at the  
4 standing order. Is it four times 500 microcuries? Is it  
5 one millicurie plus four times 250? I don't -- we don't  
6 keep track of that break down on -- excuse me, each  
7 individual order.

8           MR. ROBINSON: And it was sometime Tuesday or  
9 Wednesday of the next week after that Saturday that --  
10 after your a little more formal analysis of his -- the  
11 levels in him that you kind of concluded that it was in the  
12 maybe 500, 600 range?

13          MR. GALANEK: On Tuesday night, based on whole  
14 body counting and urine analysis. On whole body counting,  
15 I had made an error in assessing P-32 going through the  
16 body. There's a 65% correction factor for field of view.  
17 So I had calibrated the instrument. I thought there was  
18 some 200 and so microcuries in him. And then we were  
19 having a meeting with Li, and we were telling him  
20 everything was still in sort of a draft stage.

21               But you know, we knew he was also looking at  
22 numbers, and we thought we could approach this as a team.  
23 And so, I said well, if we look at this whole body data,  
24 this is what the number looks to me. And he said but in  
25 your model, are you doing this? And then Frank Masse said

1 that's right, but you didn't take in the 60-65% -- look at  
2 the paper for this.

3 And so you apply the 65% correction and it goes  
4 right up to 460 or 470. We at that time were doing urine  
5 analysis, and the numbers were looking about the same.

6 MR. ROBINSON: Okay.

7 MR. SHERBINI: The 65%, is that not standard  
8 for all phantom calibrations in your system for other  
9 isotopes?

10 MR. GALANEK: No, it would be -- because this  
11 is throughout the bone, you know, we -- more of the  
12 radioisotopes end up in the GI track. Or if we had  
13 something in someone's lung. So, that's the part of the  
14 body we're looking at, because this is a beta emitter and  
15 the bone. Back when Frank and Murray Bolton designed the  
16 shadow shielded chair, actually measured some people I  
17 guess with Strontium-90 in them.

18 So that's where that 65% factor came from.

19 MR. SHERBINI: But this factor is not -- I  
20 guess my question is, is this peculiar to just P-32 or  
21 would that be -- not necessarily 65, but some factor  
22 applicable to other calibrations of other isotopes that you  
23 might -- even for reactor work?

24 MR. GALANEK: Only if it was something that  
25 went throughout the body and in fact were in part of the

1 field that you can't see.

2 MR. SHERBINI: That's fairly common, especially  
3 for reactors?

4 MR. GALANEK: That it goes throughout the body?

5 MR. SHERBINI: Yeah, like cesium --

6 MR. GALANEK: Yeah, yeah. But not so much a  
7 bone seeker that I'm aware of. So --

8 MR. SHERBINI: Okay.

9 MR. GALANEK: If -- I guess I'm not sure  
10 where --

11 MR. SHERBINI: Well, even if it's not a bone  
12 seeker, would the correction factor still be required if  
13 the isotope distributes uniformly throughout the body?

14 MR. GALANEK: I don't believe so.

15 MR. SHERBINI: It wouldn't be?

16 MR. GALANEK: I don't believe so.

17 MR. ROBINSON: Mitch, do you have any kind of a  
18 feel for the amount of researchers that would be in that  
19 lab on weekends, Saturdays, Sundays? I mean, is that lab  
20 busy all the time?

21 MR. GALANEK: Yeah, I believe it is. I would  
22 say it's probably no different than when we've gone on our  
23 tours for the last couple of days late in the day. Ron on  
24 Monday, the rest of you yesterday. There's -- you know,  
25 there's half a dozen or so. My experience at MIT is that

1     there's typically someone in these labs --

2                 MR. ROBINSON:   Seven days a week?

3                 MR. GALANEK:   -- seven days a week.   More goes  
4     on at night than goes on in the morning.

5                 MR. ROBINSON:   Oh, yeah?

6                 MR. GALANEK:   Sure.

7                 MR. ROBINSON:   And to your knowledge, there's  
8     no -- the researchers don't log in and log out when they  
9     come to the lab or anything, do they?

10                MR. GALANEK:   No, no.   I'm fairly certain that  
11     they don't.   They only -- we have a controlled lab where  
12     they -- that they're required to do that, but not in their  
13     own laboratory.

14                MR. ROBINSON:   And they have a -- obviously  
15     they have a separate refrigerator for where they bring in  
16     their food and put their food in than the refrigerator that  
17     the isotopes --

18                MR. GALANEK:   It certainly is the rule.   But  
19     we've got on our routine surveys found it -- can I say  
20     throughout my career, I've never found someone's lunch in a  
21     refrigerator that has radioactive material?   I'd be lying  
22     to you.   But in this case, they do have a refrigerator that  
23     they identified where Dr. Li and others keep their food.

24                MR. ROBINSON:   Okay.

25                MR. SHERBINI:   It's in the lab?



1                   MR. GALANEK: No, no. It's in the  
2 administrative area.

3                   MR. SHERBINI: Okay.

4                   MR. ROBINSON: I don't have any other  
5 questions. Do either of you gentlemen have any questions?

6                   MR. GONECONTO: Yeah, just a couple of  
7 questions, Mitch. You said that you have the training  
8 period for the authorized users usually every two years  
9 they go through this --

10                  MR. GALANEK: Right.

11                  MR. GONECONTO: Can you recall if Mr. Li has  
12 ever had to have been retrained on any occasion because of  
13 any kind of mishap or anything happened in the lab?

14                  MR. GALANEK: I'm not aware of that. And Don  
15 Haes would be -- it probably would be easier for him to  
16 answer that question. But I'm not aware that Li has ever  
17 been any problem in the laboratory that would cause us to  
18 retrain him.

19                  MR. GONECONTO: Okay. Going back to when you  
20 visited his house on Sunday, -- or was that Saturday night?

21                  MR. GALANEK: Saturday night, Saturday night.

22                  MR. GONECONTO: You first visited his house and  
23 you were measuring the laundry, -- I guess was in his  
24 closet?

25                  MR. GALANEK: No, no, no. It was out on the

1 floor in a pile. And he had an athletic type bag that had  
2 laundry in it.

3 MR. GONECONTO: Could you see inside the bag?

4 MR. GALANEK: I didn't look in the bag that --  
5 I mean, all I did was put the detector in to see if I could  
6 detect any P-32. I wasn't looking for any specific piece  
7 of clothing or --

8 MR. GONECONTO: I mean, could you see that his  
9 clothes were organized in a special way that -- you know,  
10 you could tell what these clothes were worn on a certain  
11 day or --

12 MR. GALANEK: No, I was somewhat astonished  
13 that anyone could put their clothing for nine days in  
14 chronological order. I couldn't do it. And I don't know  
15 of many people who can.

16 MR. GONECONTO: Now, how big was this bag?

17 MR. GALANEK: It -- I mean, you know, think of  
18 a gym bag. You see, all it was that I'm aware of was t-  
19 shirts and underwear. That's all he did bring in to me.  
20 It seemed that he wore -- if you want to interpolate from  
21 that, he wore the same pair of shorts every day -- walking  
22 shorts. But all he brought in cataloged was the t-shirt  
23 that he changed every day, I guess, and the underwear that  
24 he changed every day.

25 Whether they were in some layered system that I

1 didn't disturb as I put my Geiger-Mueller detector in  
2 there, that is, in my estimation, the only way you could do  
3 this is go back and --

4 MR. GONECONTO: But you couldn't tell for sure  
5 because you didn't actually look inside?

6 MR. GALANEK: Correct. I didn't take  
7 individual pieces of clothing. Again, that night, he's  
8 reading a millirad per hour from him, I'm expecting to find  
9 something significant. Something that's going to change  
10 the background in my detector, and I'm not getting that.  
11 So I didn't --

12 MR. SHERBINI: So this bag had the entire  
13 week's laundry in it?

14 MR. GALANEK: Well, that's --

15 MR. SHERBINI: That's what Dr. Li said?

16 MR. GALANEK: Yeah. As I recall, as we were  
17 going into his apartment, I said gee, it will be real nice  
18 if you still have your laundry because we can check that.  
19 And he said well, my wife usually does laundry on  
20 Saturdays, so I don't know if it will be there. And then  
21 in fact, as we walked in, it was right there on the floor.  
22 I mean, his apartment is not a well decorated, well  
23 furnished apartment.

24 I mean, it seems like he has sort of a --  
25 remember when you were a student, you don't have a lot of

1 possessions. That's sort of what his apartment is like.  
2 And there's this pile of laundry. And I don't recall that  
3 it was all in the bag. I do recall it just being there as  
4 we come in. We walked in, there seemed -- there's a table  
5 on the right, dinette type table.

6 The kitchen is on the left. There's this  
7 living room type of area in front of me that dimly lit the  
8 entire apartment. And there's this bag. And I want to  
9 think that there's a pile next to it too. Whether it's all  
10 in the bag is something -- again, it would just be short  
11 term memory loss on my part. I can't swear to either,  
12 except these are the clothes that I'm checking.

13 MR. GONECONTO: One more thing. You said that  
14 when you first met with Mr. Li at the hospital, you said  
15 that he really asked right away how much he had ingested or  
16 if there was any kind of determination how much he had  
17 ingested.

18 MR. GALANEK: No, I believe Mr. Li offered the  
19 following: He said that he had worked with 50 microcuries.  
20 And when we're making these readings and then I have the  
21 urine analysis, he said well, would that be about ten or  
22 20 microcuries? That is not a number that I've offered.  
23 I'm guessing that's what he's -- because on Monday or  
24 Tuesday night when we're discussing dose, he has said well,  
25 on Saturday night you said it was ten to 20 microcuries.

1           And this time, it's fortunate there are two of  
2   us responded, because no one told him it was ten to 20  
3   microcuries. Whether he had calculated this based on his  
4   own urine analysis in the laboratory, because it's the  
5   radiation worker I've met that finds he's contaminated,  
6   takes the time to do a urine analysis, takes the time to  
7   measure another lab worker, takes the time to measure his  
8   wife, and then calls for help -- is strange to me.

9           His counting data and my counting data are  
10   different.

11           MR. SHERBINI: Which counting data?

12           MR. GALANEK: For the first day.

13           MR. SHERBINI: The urine or --

14           MR. GALANEK: Correct. He doesn't have a whole  
15   body counter. He counts his urine in his lab, and he tells  
16   me it's 2,300 counts or disintegrations for P-32, which is  
17   somewhere near 100% efficient. I count 8,000 that night.  
18   So --

19           MR. SHERBINI: Could that be attributed to  
20   different contractors or different settings on the liquid  
21   scintillator?

22           MR. GALANEK: That's what I told him. I said I  
23   believe my number to be true at 8,000 because I'm counting  
24   an open window, and this instrument will know that this is  
25   P-32. In fact, that's what I told him that maybe you have

1 your window set or you're counting it on a program that's  
2 just looking at part of the spectrum.

3 I agree with that, that he could correct his  
4 number, but on -- I believe it was Tuesday, he keeps  
5 bringing up this point that someone has told him there's  
6 ten or 20 microcuries in him. And that is his fabrication.  
7 Because as I've said earlier, I'm not smart enough, nor do  
8 I have any experience to know from one data point what a  
9 number would be.

10 I can't recall this for sure, but I would say  
11 in the conversation it could be -- if all he worked with  
12 was 50 microcuries and the scenario we might be looking at  
13 at that time is that he ingested some fraction of it, ten  
14 to 20 microcuries makes sense. If he's counted 1/4 a  
15 number and I do 43 liters times 8,000 dpm/ml; again, 1/4 of  
16 that is somewhere around 20 microcuries -- 25. So things  
17 make sense that -- at that point, I'm dealing with a person  
18 who has taken the time to make certain checks, and then  
19 seems to be checking to see what I'm going to do.

20 So, I did not say any estimate of activity to  
21 him on Saturday or on Monday of ten to 20 microcuries. I  
22 believe he was saying could it be ten to 20 microcuries.  
23 And if I answered that question -- and I don't recall that  
24 I did or not, making measurements. I would say that if the  
25 most you ever handled was 50 microcuries and you ingested

1 some portion of it -- yeah, it could be ten to 20  
2 microcuries.

3 Could be ten times that. So at no time did  
4 myself or Don Haes, when we were in each other's presence -  
5 - and we were for almost all of this -- say gee, 8,000 dpm,  
6 that's ten to 20 microcuries. Or two millirad per hour,  
7 that's ten to 20 microcuries. I don't know health  
8 physicist who could do that. Maybe there -- Sam, I've  
9 heard a lot of good things about you.

10 MR. SHERBINI: I don't know how to do that.

11 MR. GALANEK: But you just can't -- it's an  
12 impossibility if -- again, I make a measurement of a urine  
13 and I quickly calculate -- well, I told you how I would do  
14 it. If I assume it's throughout the body water, the only -  
15 - and that's because that's what you would do for tritium  
16 for a quick measure of how much is there -- that's about  
17 the only thing someone could do.

18 In fact, that's what Frank and I were doing  
19 over the phone. We were saying all right, let's just see -  
20 - it's throughout his body and he's just taken it in. It's  
21 in -- you know, 43 liters times that. He might have a  
22 couple hundred microcuries in him. We'll get more samples.  
23 But there's no -- I did not estimate ten to 20 microcuries.

24 MR. SHERBINI: What was the dose rate? What  
25 was the reading when you surveyed him that day?



1 MR. GALANEK: Tenths of millirads per hour up  
2 to I think a maximum of three or four.

3 MR. O'CONNELL: Just a couple of questions,  
4 Mitch. When you were at the health center on -- that was  
5 Saturday?

6 MR. GALANEK: The 19th, right.

7 MR. O'CONNELL: The doctor had been making some  
8 washes of the -- of Dr. Li's mouth?

9 MR. GALANEK: Right.

10 MR. O'CONNELL: Was the wash water counted by  
11 any other means other than with a GM?

12 MR. GALANEK: Yeah, liquid scintillation  
13 counter.

14 MR. O'CONNELL: You did liquid --

15 MR. GALANEK: Correct.

16 MR. O'CONNELL: Okay. The other question is in  
17 regards to the P-32 itself typically. When they get in a  
18 vial, what is the solution that the P-32 is in? The reason  
19 I ask the question is sometimes we get standards and  
20 they're in an acid solution --

21 MR. GALANEK: Right.

22 MR. O'CONNELL: -- or something like that.

23 MR. GALANEK: Right.

24 MR. O'CONNELL: And I was just wondering that  
25 if somebody did take some of the P-32 and either -- however

1 it was administered, would there be any of that sensation  
2 just as you mentioned, Larry, as far as if it was an acid  
3 base, you may get some type of acid burn?

4 MR. GALANEK: I don't know. We'll look at  
5 that, because I just don't know. It always says carrier  
6 free or something, but I don't --

7 MR. O'CONNELL: Well, you know, it could be --

8 MR. GALANEK: This is pH neutral only because  
9 these are biological experiments, and biological  
10 experiments don't like harsh conditions.

11 MR. O'CONNELL: Right.

12 MR. GALANEK: So usually it's a buffered  
13 solution, and my guess is it's pH neutral. But I'll look  
14 into that. And that's a good point. Dr. Li never  
15 discussed a symptom that he had any burning in his mouth or  
16 anything or any bad taste or anything to us.

17 MR. O'CONNELL: Okay, thanks.

18 MR. SHERBINI: Any more questions? Okay,  
19 thanks, Mitch. I'm required to hand you this -- it's a  
20 page or a couple of pages of printed copy that explains how  
21 the transcripts are handled. You know, what you're  
22 supposed to do with them and what we will do with them as  
23 far as putting them in the public building and so forth.

24 MR. GALANEK: Okay.

25 MR. SHERBINI: Okay, there are no more

1 questions for the record. The interview ended about 3:00.

2 (Whereupon, the proceedings were adjourned at

3 2:56 p.m.)

4

## C E R T I F I C A T E

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

Name of Proceeding: INTERVIEW WITH MITCHELL S. GALANEK

Docket Number: --

Place of Proceeding: Cambridge, Massachusetts

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

---

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