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From: Mitchel Galanek

Subject: Review of NRC Incident Investigation Team Transcripts

Date: November 8, 1995

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The Nuclear Regulatory Commission will be at MIT on Monday and Tuesday, November 13-14, 1995 to allow for review of your transcripts. The review will take place in building 20. If you plan to review your transcript, please come to the Radiation Protection Office, Room 20C-207 between 9:00 AM and 5:00 PM on these dates.

If you do not wish to review your transcripts, please indicate below and return to me in 20C-207.

Thank you for your cooperation.

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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INCIDENT INVESTIGATION TEAM

+ + + + +

INTERVIEW

OF

DR. DAVID E. HOUSMAN

+ + + + +

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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MONDAY,

OCTOBER 23, 1995

4:30 p.m.

+ + + + +

INTERVIEWERS:

ALAN L. MADISON

BETSY ULLRICH

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

(4:36 p.m.)

INTERVIEWER ULLRICH: It's 4:35 p.m. on October 23rd. This is an interview with Dr. Housman.

DR. HOUSMAN: Indeed.

INTERVIEWER ULLRICH: Okay. And I'm Betsy Ullrich. I'm with the Nuclear Regulatory Commission. I'm the senior health physicist in Region I.

INTERVIEWER MADISON: I'm Alan Madison. I'm with the Nuclear Regulatory Commission out of NRC headquarters. I'm in the program office that has responsibility for the incident investigation program.

INTERVIEWER ULLRICH: As you know, we're part of the incident investigation team reviewing the contamination incident that occurred at the Cancer Center. We're looking into the possible causes of it hopefully to find out what happened and to determine if there is some information we can pass on back to the R&D community and the regulatory community about improvements that could be made or lessons learned from the incident.

We are conducting the interviews on tape so that we can get a transcript. That frees us up from having to worry about taking notes during the interview. It also provides us with a reference to which we can refer later on.

The transcript will be available for you to review within 24 hours if you so desire. You don't have to review it unless you want to. If you do review it, we'll provide you with an errata sheet. Any corrections that you would want to make will be put on the sheet. And that would be attached to the transcript, then.

At the end of our investigation, we will be issuing a report in the form of a NUREG. That will be publicly available when it is published. And at that point the NUREG and the supporting transcripts would be placed in the public document room.

Before you leave, we'll give you a written description of this information, how you get your transcript in order to review it, who you should contact for that. And we'll make sure we hand that to you before you leave.

DR. HOUSMAN: Great.

INTERVIEWER ULLRICH: Okay?

DR. HOUSMAN: Yes.

INTERVIEWER ULLRICH: What I'd like to do is start out getting your background, what your position is at the university and what your involvement with the Radiation Protection Committee is.

DR. HOUSMAN: Okay. I've been on the faculty of MIT for 20 years now.

INTERVIEWER MADISON: Excuse me, sir. Let's start off with your name.

DR. HOUSMAN: We didn't have that in --

INTERVIEWER MADISON: I'm sorry. Name, title, and --

DR. HOUSMAN: My name is David E. Housman, HOUSMAN. I am currently professor of biology at MIT and a member of the Center for Cancer Research. I came to MIT as a faculty member in July of 1975 from the University of Toronto, where I was assistant professor of medical biophysics at the University of Toronto and a staff member of the Ontario Cancer Institute.

And I've been here for the last 20 years as a faculty member and staff member at the Center for Cancer Research. During that time I was promoted from assistant to associate to full professor. And that's who I am.

INTERVIEWER ULLRICH: Okay. And in your laboratory, do you handle radioactive materials?

DR. HOUSMAN: Yes, although let me backtrack for a moment because you asked about my connection with the radioactive -- the --

INTERVIEWER ULLRICH: Radiation Protection Committee.

DR. HOUSMAN: -- Radiation Protection Committee or the Radiation Protection Program at MIT. I need to get

on the record that I have been an active member of the Radiation Protection Committee at MIT, which, in fact, meets in this very room we're sitting in. I can't tell you exactly without examining my records, but I think it's probably a period of about 10 years, something like that.

INTERVIEWER ULLRICH: Okay. And you are a representative as a user of isotopes on that committee?

DR. HOUSMAN: As a user of isotopes and as a faculty member.

INTERVIEWER ULLRICH: Okay. Could you describe a little bit of the kinds of activities the Radiation Protection Committee performs?

DR. HOUSMAN: Sure. The Radiation Protection Committee carries out essentially oversight of the Office of Radiation Protection here at MIT and is actively involved in the specific authorizations that are brought through the Radiation Protection Office through the committee. So it's our job to examine each of these authorizations and, in fact, approve them or to make recommendations other than approval should we deem that to be appropriate.

In addition, we have oversight in a general way over the activities involving radiation protection around the campus. And it is the purview of the committee to look at and examine all programs involving this area throughout

the institute.

Our general mode of action has included, in addition to the meetings -- the meetings involve some of the examination of the individual protocols for approval. We also look at each meeting at a particular issue in radiation protection on the campus.

So, for example, what comes to mind, for example, is we've instituted a laser safety program on the campus. So we will have the -- you know, we'll see that in several forms. We'll see that in concept, what the issues are, what the potential approaches are.

We'll then, you know, go back and forth over what the strategy will be for the program, give direction to the RPO regarding how to implement that program. And then that will come back to us with the implementation in a future meeting. And this is basically how we operate.

INTERVIEWER ULLRICH: Okay. Let's start with the approval of authorizations. What is involved for you as a member of the committee in approval of authorizations?

DR. HOUSMAN: Each specific authorization will have listed on it the isotopes, the type of procedure that will be carried out, and some level of detail as to how these procedures would be carried out.

In a case where the authorization is within a field that I'm particularly familiar with, it would not be

uncommon for me to ask a question regarding a specific aspect of the protocol.

Yes, they're going to be using this isotope. Exactly what do they -- you know, could you give more detail about what they're using it for or has there been a problem here? How have you approached that problem? You know, what's the strategy been wherever there have been specific issues that one might consider to be a -- you know, a significant point and vice versa.

You know, the RPO will come to us and ask for, you know, our experience, you know, what is happening at the other side of the fence. How do you in your own experience see this problem and how do you suggest that we approach a situation of this type?

Those are the kinds of transactions that take place in the Radiation Protection Committee or at least that's been my experience over the past 10 years.

INTERVIEWER ULLRICH: So you get a copy of the authorization request or application?

DR. HOUSMAN: Yes, prior to the meeting.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: Bring that, look at it, and, you know, formulate whatever questions I might have prior to the meeting, bring it to the meeting. Additional questions might come up at the meeting other than those that I had

formulated prior to the meeting. Those questions will be discussed.

And I would say that of a typical Radiation Protection Committee meeting, I would say a half to two-thirds of the time depending on the other topic to be discussed is devoted to the discussion of the authorizations. And obviously it also depends on how many are coming through that particular time.

But in general no less than half the time that we meet is discussion of the specific authorizations and the kinds of issues that I just alluded to.

INTERVIEWER ULLRICH: Do you have a typical time that your meetings run or a time limit?

DR. HOUSMAN: There's no time limit, but generally meetings -- meetings certainly never are less than 90 minutes. I've never been in one that was over in less than 90 minutes. They generally don't run over two hours unless there's a, you know, real serious question that, you know, we all really want to just -- "Let's keep talking about this because we're not finished." But I'd say 90 minutes to 2 hours is a generally, you know, usual time for such a meeting.

INTERVIEWER ULLRICH: Okay. Is there a particular activity level in terms of amount of radioactive material in a request that would trigger your curiosity?

DR. HOUSMAN: It's not so much a particular activity level that would trigger my curiosity. It's the activity level in relation to the type of procedure performed.

And every once in a while I have to say you will see what turns out to be a typographical error. There are, you know, millicurie versus microcurie or something like that or, you know, a decimal point misplaced.

And, you know, you very, very quickly pick something like that up if you see it, but, you know, 9 times out of 10, by the time you get to the meeting, that sort of thing has already been picked up.

So, you know, that's how I look at them. I can't speak for other people. But, you know, if you see a, you know, discrepancy with what's within your experience and the type of procedure that's being indicated, that's where you really start to ask questions.

INTERVIEWER ULLRICH: Okay. About how much time prior to the meeting do you typically get paperwork?

DR. HOUSMAN: It's usually a week or so, something like that. I couldn't tell you exactly, but, you know, the chances are I wouldn't look at it prior to a week before the meeting is what it boils down to.

INTERVIEWER ULLRICH: Okay. In terms of the activities of the Radiation Protection Committee aside from

authorizations, what other things would you look at? You had mentioned the laser safety. What kinds of issues get brought to your attention?

DR. HOUSMAN: I think just about everything you can imagine on the campus that has to do with radiation safety, certainly storage and disposal of isotopes, the question of sealed sources, the question of the, you know, decommissioning of a reactor.

I mean, everything from, you know, the biggest to the smallest comes through. And it's really a question, I guess, sometimes of, you know, what's -- you know, what are the most significant issues out there?

And sometimes it's a question of here's a new issue. Like, laser safety was not an issue perhaps, you know, 10 years ago. That wasn't on the table. And, you know, now it's very much on the table.

INTERVIEWER ULLRICH: Sure. Now, we're here interested in the contamination of that.

DR. HOUSMAN: Sure.

INTERVIEWER ULLRICH: Can you give us a context in terms of have you seen contaminations or other evidences of contamination brought to your attention at committee meetings?

DR. HOUSMAN: Sure. And, you know, the -- over the years -- and we can check the, you know, minutes on

this -- there certainly are, you know, issues regarding contaminations that come to the attention of the committee, usually within the context of something that was not so routine, something, you know, this is a problem that came up, and this is, you know, the set of issues that it raises and, you know, it would be important to talk a little bit about what should, you know, be done as follow-up on this or something like that.

INTERVIEWER ULLRICH: Okay. Okay. Have there been any recurrent problem areas that have been brought to the attention of the committee?

DR. HOUSMAN: Well, I think the simplest way to put that is that this is an ongoing process in which there, you know, is a sort of range of both level of concern. If there's a, you know, sort of big amount of isotope out there that really is -- even has a little, teeny, bitty, weeny bit of uncertainty, that's going to come back.

How do we deal with, you know, this particular, you know, big amount of isotope? If there is a -- you know, you know, there's also the constant, you know, sort of day to day: How do we keep the troops in line, so to speak, as we deal with the more routine, you know, smaller amounts of radioactivity? How do we make sure that the procedures and protocols are adhered to as we carry out work with the more standard day to day amounts?

INTERVIEWER ULLRICH: Okay. How does the committee deal with individuals or work groups that apparently are not adhering to the rules?

DR. HOUSMAN: From time to time that issue has come up through the question of authorizations. And what the committed can and will do is one of several things that are usually interrelated. We can recommend to the Radiation Protection Office, usually in conjunction with their view, that a group undergo more training, get retraining.

And at the same time we can limit their authorization to a much shorter period of time in relation to that authorization. In other words, their authorization can be essentially held to a very short time frame as its retraining takes place with the intent of making sure that a group that has, you know, moved towards the edge of compliance understands that there's a serious agenda here and an appropriate response is required.

And that's -- I think if you go through the record, you'll see some occasions where the length of authorization is considerably less than the standard two years. And that's pretty much, you know, sort of across the board.

It isn't in one particular, you know, unit of the institute. It's more or less when the committee feels,

particularly when in conjunction with the RPO the feeling is, that a particular group or area needs to be focused on and the message needs to be communicated that tighter control and more effective procedures need to be put into place, sometimes both.

I mean, sometimes it really is a procedural thing. They aren't -- they're a good group, but they aren't that familiar with a new kind of thing that they're doing and they really need to get familiarity with it.

Other times it can be a group that is not doing such a good job of, you know, responding to the procedures that are required and we need to make sure that they are very fully communicated the message, "These are the procedures. This is what needs to be done. And we'll retrain you 'til the cows come home if that's what's required."

INTERVIEWER ULLRICH: Okay. Now, the process you just described sounds a lot like an event, I guess, that someone told me about earlier this week. They've referred to it as probation that Dr. Tonegawa's group had been on perhaps a year or so ago. Is that considered a probation period where the authorization is shortened?

DR. HOUSMAN: "Probation" is a word that carries with it a certain amount of emotional baggage, I guess.

INTERVIEWER ULLRICH: Sure.

DR. HOUSMAN: But, you know, my view of it is that you're setting up a fairly tight rein in order to address the problems that clearly have been documented, clearly need attention in terms of people in a group receiving the training that communicates to them "This is the right way to do it."

I wouldn't say that Tonegawa's group, by the way, is the only group that's ever received such a recommendation. I can't quote the records for you from memory, but I do know that this is basically how we see the program as a whole.

And whether it's Center for Cancer Research, Chemistry, you know, Nuclear Physics, whatever, if somebody's not getting it done, that's sort of the first level that you want to go to to really try to get their attention and make sure that they're clear on what the issues are.

INTERVIEWER ULLRICH: Okay.

INTERVIEWER MADISON: So you're saying it wouldn't have actually been called a probation, it might have been called something else?

DR. HOUSMAN: I wouldn't know what we -- you know, I wouldn't think there was a term "probation" stamped on it. I would say "Your approval is for three months."

Interpret that as you will. Standardly, when there's been, you know, a good record from a group, the approval period is two years.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: And, you know, you can draw your own conclusions

INTERVIEWER ULLRICH: That clears up some confusion I had in my mind. Okay. That's good.

Do you recall what the reason for them having a shortened period was?

DR. HOUSMAN: To be absolutely honest with you, I don't know specifics without going over the record.

INTERVIEWER ULLRICH: Well, we've asked for the committee records. You would expect it would be reflected there?

DR. HOUSMAN: Yes.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: I mean, I think a fair thing to say is that it probably would not be considered to be a single incident. I think more likely what the Radiation Protection Office is concerned with are patterns. And that would be my guess if we go -- you know, and that's what we'll generally talk about.

There may be one particular incident you'll see in the record as one of particular concern, but that, you

know, exactly -- you know, there is an incident in a given working group. It's looked at against the pattern of performance of that group. And, you know, if it's a group that had an accident but in general they're very careful, very compliant, we're less likely to take that view than a group that seems to be struggling with the compliance and is having a little bit more trouble on a general basis adhering to procedures.

INTERVIEWER ULLRICH: Okay. I want to go into a slightly different topic. So, Alan, do you have any questions on this particular before I change it?

INTERVIEWER MADISON: On the probation question?

INTERVIEWER ULLRICH: Yes.

INTERVIEWER MADISON: No.

INTERVIEWER ULLRICH: You had said that the committee also has some general oversight of the Radiation Protection Office. Could you elaborate on that a little?

DR. HOUSMAN: Well, I think the way I see it is that our concern is the sort of strategies and procedures that are going to be used to deal with radiation protection issues.

And one sort of simple example is the rates for, you know, disposal are going through the roof for various isotopes. How does the Radiation Protection Office

deal with that question? I mean, there ---

INTERVIEWER ULLRICH: You're talking about cost when you say "rates"?

DR. HOUSMAN: Cost, yes, yes. I'm saying for, you know -- and that's a strategic issue that, you know, if you're a corporation, the -- you know, the board of the corporation is the appropriate and ultimate, you know, decider of the right approach to take. I see our role here as similar. The Radiation Protection Office is the executer of the policy.

But we've got to say, "Yes, it makes sense to set up a storage facility for the P-32" or "No, it does not" or "Here's an intermediate course of action" or, you know, the RPO would place options before us saying we can do this or this or that.

Our job is to examine those options critically and essentially come to an intelligent and informed decision that represents, you know, the MIT Corporation in this room saying this seems like the right choice to make, you know, to the best of our knowledge, this makes the most sense.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: That's how I see the activities in terms of oversight. I say that may not be the whole story in the sense that, you know, I think it's fair to say

that the Radiation Protection Office looks to the committee as a kind of source, on the one hand, of information about how the issues of radiation protection are looked at from the side of the faculty and from the side of the institute.

I think at the same time the transaction is to, you know, reach some understanding on issues at all levels of what's to be done, what's the policy to be.

We are the deciders of policy. RPO is the executers of policy. And, yet, RPOs certainly have a level of technical expertise and detailed knowledge of what's going on in the area of radiation protection that we as individual committee members don't have.

So there's a transaction that goes on, but we are concerned with setting policy. They are providing information and data and potential options, if that makes sense to you.

INTERVIEWER MADISON: In the 10 years, your 10-year experience on the committee, has the committee ever audited the performance of the radiation protection group?

DR. HOUSMAN: Well, I would say that that isn't exactly how I see the function in the sense that the radiation protection procedures at MIT are regularly audited by the NRC.

And so we see our role as looking at the NRC visits and trying to make sense out of their sort of

professional view of what happens here and, you know, respond from our perspective, which is setting policy saying "NRC's audit of your policy says this, this, and this, I think we ought to fix this, this, and that if there's a" -- you know, in other words, we -- even if NRC says, "This is what ought to be done. There needs to be input from the MIT side in order to be able to actually institute a policy that represents what NRC" --

INTERVIEWER MADISON: But you haven't performed any audits of the RPO to ensure that your policies have been implemented by the RPO. Is that correct?

DR. HOUSMAN: You know, that's an interesting question because, I mean, the truth of the matter is since each of us on the committee is involved with the use of isotope, I think we have a very intimate sense of how the policies are being implemented; in particular, in relation to our particular areas of activity and expertise. So when you get the group together in the room, we have actually I think an almost day to day familiarity with what RPO is doing that is perhaps a little different maybe from what you can get from an audit from the outside, actually.

We don't have a formal audit in the sense that you're alluding to because I think we're --

INTERVIEWER MADISON: Have you ever taken a tour of any of the labs within the Cancer Center?

DR. HOUSMAN: Oh, in the other labs in the Cancer Center on a daily basis.

INTERVIEWER MADISON: What do you look for when you go in those labs?

DR. HOUSMAN: Well, I'm there. I mean, I'm -- you know, I wouldn't say that I'm necessarily looking for anything, but, you know -- so it's not like -- I mean, I could just as easily be in any one of the labs, not just in the Cancer Center, but in almost any lab, at least within the Biology Department.

I mean, no question I might well be found there. And I might be looking for lots of other things besides radiation protection issues. You know, the question is: Do I take a tour of those labs in the guise of as a member of the Radiation Protection Committee?

I've certainly been in other labs, but I'm -- why don't you be more specific in what you're trying to get me to focus on here.

INTERVIEWER MADISON: I'll ask the question again. Have you performed any specific audit or inspection of any of the functions of the Radiation Protection Office as a member of the Radiation Protection Committee?

DR. HOUSMAN: Okay. What can I tell you here? Because what I can do, what I would do is if -- let's say, you know, a laboratory -- Tonegawa lab might be an example

here. What I might do is interact with the Radiation Protection Office over issues that arise from a case out of Tonegawa lab. That might well happen. I wouldn't necessarily call that an audit, but there might be a transaction.

It might take place in the committee meeting. But it also might take place off line if we're together trying to understand what to do. And I might talk to someone from the Radiation Protection Office regarding their concerns about a particular lab group and respond with, you know, my view of what is happening in that lab group. I wouldn't call that an audit, but that's how we work.

INTERVIEWER MADISON: And the other aspect of that is when you go into the lab, another lab, as a functioning member of the Radiation Protection Committee, in looking to see if the policies that the Radiation Protection Committee established are being enforced by the Radiation Protection Office are, in fact, being complied with in that laboratory. Have you performed any of that type of an audit?

DR. HOUSMAN: I wouldn't do -- I wouldn't say that I've done that in a formal sense. I mean, I -- you know, I'm in those labs all the time anyway, but there's no time when, you know, I would put on a Radiation Protection

Committee hat and walk into the lab next door and say, "I am auditing you from the perspective of the Radiation Protection Committee."

INTERVIEWER MADISON: Okay. Can you give us a sense of: Is there any particular portion of the lab, the Cancer Center that is better than or worse than any other particular portion of the Cancer Center in its compliance with your guidelines?

DR. HOUSMAN: That is not a simple question to answer because I think the only way I could answer that question is to say I think there certainly are gradations within the Cancer Center. And I think the fact that there was certainly a choice made by the committee to limit the authorization of the Tonegawa lab is an indication of the views of the committee in that regard, and that might not be too far from my personal experience.

But, you know, if you want me to sit there and say, you know, "Lab X looks a little better than Lab Y," you'd be putting me into a situation where: a) I'd be uncomfortable; and b) frankly, I haven't put together the data. I mean, I haven't gone out from lab to lab with that hat on, with that view in mind.

But, you know, what I have looked at is exactly what I told you. Problems arise. There's been a spill. There's been an incident in Lab X. What does that reflect?

Does that reflect a systematic program of problems in respect to compliance in that lab? Does it more likely represent a, you know, specific unusual incident, for whatever reason, in that lab?

I would feel comfortable giving my sense to the RPO in essentially conjunction with an exchange for their sense. They have a very different perspective because they know a lot of detail that I don't know about day to day activity. They deliver and pick up from each lab every day. So they have some sense of what's going on there.

So, you know, if you, you know, push me on it, I suppose, you know, if I were forced to, I could rank labs into groups or something like that, but it would be rather uncomfortable to do so.

INTERVIEWER MADISON: I'm not asking you to do that.

INTERVIEWER ULLRICH: Okay. Let's put on the principal investigator hat, then.

DR. HOUSMAN: Sure.

INTERVIEWER ULLRICH: You have an authorization issued to you. An RPO-1 form I think it's referred.

DR. HOUSMAN: Right. It is.

INTERVIEWER ULLRICH: Okay. What are your responsibilities as the authorized individual on that board?

DR. HOUSMAN: I guess my main responsibilities are: number one, to see that everyone who uses radioisotope in the laboratory does go through the training at the Radiation Protection Office and that that training is really understood.

Number two, my responsibilities are to monitor the procedures in the laboratory to see that the procedures in my laboratory, in fact, conform to the policies and procedures that we as the MIT Radiation Protection Committee have authorized and the -- by extension, the rules that are promulgated by NRC are adhered to. That's my responsibility.

INTERVIEWER ULLRICH: Okay. On a day to day operations point of view, how do you do that?

DR. HOUSMAN: Okay. What we do in my lab -- and this is pretty much traditional -- is the technical staff pretty much has the oversight of the details of day to day activity with the control of radioisotope. Each individual in the laboratory uses radioisotope individually.

The technical staff is -- you know, we meet from time to time to try to see if we can keep things as tight as we can. Technical staff is concerned with, you know, what are the procedures, how those procedures are to be changed. And they do change. They've changed a lot

over the years. How do we implement? And how do we do our best to make sure that everybody understands what they're supposed to be doing, although the technical staff is not responsible to ultimately ride herd on individuals because each individual who is authorized ultimately is, you know, responsible for their actions and, you know, if there's a problem -- I can recall, you know, a few years back we had an individual in the lab who technical staff and I were not that happy with.

And luckily that person wasn't there for that long. But we started to make an effort to see what can be done to discipline, contain, and otherwise prevent this particular individual's lack of attention to the procedures from becoming a problem. And that's what we do.

INTERVIEWER ULLRICH: When you say "technical staff," what positions are you talking about?

DR. HOUSMAN: What the MIT log will read is "Division of Sponsored Research research staff, DSR staff." So these are people who have, you know, at least a B.A., sometimes an M.A., usually not Ph.D. level people, but they are people who essentially provide a lot of continuity around the lab.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: They are there for several years usually. They are often, you know, folks who, you know,

eventually go on to, you know, higher pursuits of one sort or another. But they are folks who, you know, are there, you know, 40 hours a week, both on paper and in reality, as sponsored research staff.

INTERVIEWER ULLRICH: Okay. Is your laboratory a molecular biology lab?

DR. HOUSMAN: Yes.

INTERVIEWER ULLRICH: So you're handling P-32 principally?

DR. HOUSMAN: P-32, some S-35 for sequencing. Those are the two major isotopes that we deal with.

INTERVIEWER ULLRICH: Okay. Does your laboratory also have a standing order system to receive materials?

DR. HOUSMAN: We have a system. "Standing order" is the right term for it, but we don't receive a regular shipment on it.

INTERVIEWER ULLRICH: Okay.

DR. HOUSMAN: In other words, in order to activate an order, either a laboratory member or a member of the technical staff needs to write out an authorization saying "We require such an amount of radioactivity of such a type at such a time." And, you know, the standing order aspect of it relates, really, to the overall price that you get from the supplier, but nothing comes unless we order

it.

INTERVIEWER ULLRICH: When your staff orders material, is that material a stock for the group or do they tend to order it for individuals?

DR. HOUSMAN: The situation in my lab is that the majority of what we order is assigned to individuals, but there is a lab stock that's maintained such that an individual who needs a small amount has the opportunity to acquire that amount from the lab stock without necessarily having to put in an order.

So I'd say it's about two-thirds, maybe three-quarters individual and one-third lab stock is the basic way that we assign it.

INTERVIEWER ULLRICH: Okay. Could you describe how individuals, particularly whoever is in charge of the stockpile, keep track of what is used and where it is?

DR. HOUSMAN: Okay. Clearly when an individual is the ordering person. And that's pretty much their responsibility. If, you know, they choose to relinquish, you know, any portion of that particular vial to other individuals in the lab, that's fine, but that's how that's dealt with.

We have a system that is not as good as I'd like it to be, but it's not too bad, where we essentially ask people to keep track of what they take out of the

stockpile. There's two reasons for it. One is the obvious, you know, issue of, you know, control. And the other is we want to know when we're going to run out.

INTERVIEWER ULLRICH: Sure.

DR. HOUSMAN: So, you know, generally, you know -- so if it's -- generally a stockpile is going to be a half millicurie or a millicurie, tops. And, you know, 50 or 100 microcuries is generally what an individual might choose to use in a given procedure.

And we would expect them to mark off they've taken it. And then, you know, when we're down to, you know, 200 microcuries or something like that, we know it's time to reorder.

INTERVIEWER ULLRICH: Do you keep a log on a refrigerator or in a notebook or how? Where would people note that?

DR. HOUSMAN: Well, the truth of the matter is we note it on the vial.

INTERVIEWER ULLRICH: Oh, okay.

INTERVIEWER MADISON: Who's responsible for checking the vial periodically to make sure your inventory level is -- the 200-microcurie level is your order point. Who checks to --

DR. HOUSMAN: There's one member of the technical staff whose specific responsibility is the order

maintenance and control of radioactivity.

The way this technical staff works, we have one person who does radiation and one person that does enzymes, you know, one person who does inside ordering, one person who does outside ordering. And there's a fair amount of coordination. At times we have rotated those jobs. So on a monthly basis, an individual will get one of those four jobs. And so there's a fair amount of variety.

More recently we have been having a single individual do a particular job. And there's disadvantages and advantages to both. The advantage of having, you know, the same person is they really know the job well.

The disadvantage, I suppose, is if that particular person goes on vacation or something like that. You don't have someone who's as immediately knowledgeable about the situation to come in. So we've gone both ways on that.

INTERVIEWER ULLRICH: Is this system typical of how other labs work?

DR. HOUSMAN: Yes and no. I think that in general there's a fair amount of individual ordering of isotope. I mean, my sense is that, you know, there are sort of two categories of isotope use. There are the steady users of, you know, what from our perspective seems like fairly significant amounts, millicurie, two

millicuries, three millicuries, that sort of thing, because they're doing a procedure repetitively that requires that usage.

Then there is a group of individuals whose procedures will vary and, you know, may not use isotope for, you know, a week, two weeks, a month and then, you know, might use isotope, you know, in a concentrated period for a couple of weeks and then might not use it again for a couple of weeks or whatever.

So I think that's probably a pretty, you know, sort of organization amongst different labs, but I think the question is some labs have more people who are constant users and few who are non or inconstant users and some labs have more who are inconstant users.

And clearly the sort of stock supply strategy is more likely to be used amongst the folks who are, you know, infrequent or, you know -- I shouldn't say "infrequent," but --

INTERVIEWER ULLRICH: Perhaps more sporadic.

DR. HOUSMAN: "Sporadic" was the word I was looking for. Sporadic users. You just don't know who's going to be using how much.

INTERVIEWER ULLRICH: How does your laboratory deal with preventing unauthorized access to the radioactive material?

DR. HOUSMAN: Well, to be honest, that's a question that we've had a lot of discussion about of late because the presumption, I guess, that we've had is that our isotope is not in a place that's particularly obvious to the non-knowledgeable individual. And it would be quite surprising to us to have somebody suddenly appear knowing exactly where to look for it.

We do not at this time have our isotope under lock and key.

INTERVIEWER MADISON: What floor are you on?

DR. HOUSMAN: Fifth floor.

INTERVIEWER MADISON: You're on the fifth floor? Where are your isotopes kept?

DR. HOUSMAN: We have isotope at four degrees in a box in the cold room. So you need to know where to look.

INTERVIEWER MADISON: This is for the individuals' controlled material as well as the group's controlled material?

DR. HOUSMAN: That's where our P-32 is. Our S-35 is kept frozen. So that's in a freezer. And that would be, I think -- and it's sort of -- you can say people don't immediately know where it is. I mean, there are a number of freezers that or fridges that will be marked, you know, "Appropriate for storage of radioisotope." I suppose

you could imagine that someone who really wanted to raid the laboratory is going to be able to --

INTERVIEWER MADISON: The refrigerator or freezer, are they maintained inside your laboratory or are they accessible from outside?

DR. HOUSMAN: They're inside the lab. There's nothing that -- there's no fridges and freezers in the hall. So they're inside the lab. Lab doors tend to be open during the day when the lab traffic is heavy. So that would be quite unusual for someone to be able to wander in and not be noted during the time when the lab doors are open.

Late at night the lab doors generally are shut and locked. Weekends represent something of an in-between situation in the sense that there's a fair amount of activity during the day on the weekend. And the doors tend to open when the work level is significant.

INTERVIEWER ULLRICH: Sure. When did you first become aware of the contamination incident in Tonegawa's lab?

DR. HOUSMAN: Well, surprisingly, I became aware of it rather late. I was checking my calendar because the Radiation Protection Committee meeting of the 12th of September was one that I did not attend. I was at the Human Genome Council meeting those two days, Monday and

Tuesday of that week.

Normally, you know, we try and schedule these things so, you know, we can all attend. What happened there, I realized, was that the council meeting normally goes until midmorning. And then I come and take a noontime plane and get here so I can attend an afternoon meeting. So when they said, you know, September 12th, you know, 1:30 or 2:00 o'clock, it looked fine.

Then I discovered we had a joint meeting with the Department of Energy Genome Program that ran until 4:00 in the afternoon. So I missed that one. So I did not hear about it at the time. I only heard about the incident essentially later on in time after the fact.

INTERVIEWER ULLRICH: You did not hear about any of the activities in August that were going on on the third floor?

DR. HOUSMAN: No, I didn't, to tell you the truth. I think I was quite surprised by the whole thing. In retrospect, there may have been some effort to try and contain and protect the individual involved. That's my sense of the situation.

It's often not trivial to find faculty in mid August. I was here on campus at the time until the 29th of August. So I was here.

INTERVIEWER ULLRICH: Okay. What were the

committee's discussions and outcomes regarding the incident?

DR. HOUSMAN: I wasn't there.

INTERVIEWER ULLRICH: Oh, you weren't at the meeting.

DR. HOUSMAN: Yes.

INTERVIEWER ULLRICH: That's right. Okay. And you're not due for another meeting --

DR. HOUSMAN: It should be happening soon. And I think six times a year, should be one coming up shortly.

INTERVIEWER ULLRICH: Okay. Is there anything else that you might know about that contamination incident that we haven't discussed at this point that would be relevant?

DR. HOUSMAN: No. It's quite shocking to me, obviously, and --

INTERVIEWER ULLRICH: You've worked with isotope and supervised people working with isotope for a long number of years. Have you come across an incident similar to this in your experience?

DR. HOUSMAN: It's really -- as I said, really kind of shocking, this type of incident. And, you know, an incident of perhaps knowledgeable ingestion I think I'm aware of. I mean, that's certainly -- you know, thyroid burden from I-125 use is, you know, common everyday

experience.

The surprising part in this case, I think, to me is just the fact that there's no traceable and proximal source to the internally ingested radioactive material. That's what really --

INTERVIEWER ULLRICH: You would have expected to find something else if there were an ingestion?

DR. HOUSMAN: If you're working with isotope and you get it in you, you usually know it. You know? I mean, the days perhaps of mouth pipetting of radioisotope are long gone now, but I go back far enough so that, you know, hand pipetter just didn't exist. People conceivably could have done such a thing.

That wouldn't have, you know, shocked me if you -- or if you know that you got some on your -- you know, on some part of your body or something like that and some way knew how it had been transmitted internally, that would -- it wouldn't -- I wouldn't be very happy about it as a sort of Radiation Protection Committee member that that had happened, but it wouldn't shock me that it had happened.

In fact, there's no clear pathway from the point of acquisition of the radioactivity to the point that its discovery is what's really, you know, hard for me to put into perspective.

INTERVIEWER ULLRICH: Let me draw a little bit

on your historic-type knowledge. We've had a number of people tell us that they wouldn't even conceive of mouth pipetting because they don't think you could mouth pipette the quantities that are used today. Were these the same kind of quantities that were used when mouth pipetting was perhaps more common?

DR. HOUSMAN: I was started as a graduate student in 1965. I don't believe that there were hand pipetters invented at that point, if I'm not mistaken. I remember my first use of radioisotope involved a 10-millicurie quantity. I remember opening the bottle, reading the label, and saying "Not for Human Use." And I remember spending the entire weekend really being terrified.

I used the stuff on Friday. I came in on Monday, and I was absolutely -- you know, I had spent the whole weekend pretty scared about the whole thing and then went to the library and discovered that, in fact, the reason it wasn't for human use was that for actual treatment of polycythemia vera, which is what P-32 was used for at the time, the quantities were actually much higher than I had been handling. That was of interest to me at that time.

But, you know, in those days I -- I may be misremembering, but I think there was no other way to get

it out of the vial. You either had to use a syringe or you had to use a pipette. And those were -- neither option was particularly a great one from today's standpoint.

INTERVIEWER ULLRICH: Do you recall the volume that it might have been in?

DR. HOUSMAN: It wasn't too big. I'll tell you that. I'll tell you the other thing I remember, which is that I remember that it was something like $15 the first millicurie and a dollar for every millicurie after that. That I remember.

INTERVIEWER ULLRICH: It's a little different now, I believe.

DR. HOUSMAN: Yep.

INTERVIEWER ULLRICH: Okay. Okay. I have covered everything I had on my checklist in terms of the committee questions and laboratory practices. Do you have anything else?

INTERVIEWER MADISON: I have no further questions.

INTERVIEWER ULLRICH: Okay. Anything else, anything you want to ask us or --

DR. HOUSMAN: I don't think there's too much I can add. It's just, you know, feel free to give me a call. And I'd be glad to come back and tell you anything else that might be helpful.

You know, I guess I will add something because the key issue, really, that you have been getting at, I think, among others, is the relationship between the Radiation Protection Office and the Radiation Protection Committee. And, in spite of the fact that you've got a tough task ahead of you in sorting out what went on in this incident, I have a very strong positive feeling about the activities of this particular Radiation Protection Office. I feel they're very conscientious, careful, and professional in what they do. And, you know, I really respect them and have had a very positive feeling about working with them over the years. That's the only thing I want to add.

INTERVIEWER ULLRICH: That's fine. We'll give you the paper that describes how you can contact for the transcript, the name and telephone number at the bottom of the individual.

DR. HOUSMAN: Great.

INTERVIEWER MADISON: And the phone number at the bottom, that can also be used if you can think of anything else you want to talk about or anybody else that would like to talk to us can call that.

DR. HOUSMAN: Sure.

INTERVIEWER ULLRICH: As long as we are here.

DR. HOUSMAN: Sure. No problem.

INTERVIEWER ULLRICH: I mean, up until the time when we finally get --

INTERVIEWER MADISON: Or we can be contacted through the Radiation Protection Office.

DR. HOUSMAN: I mean, I don't think I'm going to avail myself of the corrections or anything like that because I feel very comfortable with our interaction. I don't think I've misstated anything or misspoken on anything, but, you know --

INTERVIEWER ULLRICH: No. But I will tell you that I was quoted as talking about a linear clock when it was, in fact, a linear plot. So things like that occasionally you might want to check.

DR. HOUSMAN: I will look at the transcript for sure.

INTERVIEWER ULLRICH: So it's up to you, I mean, something like that --

DR. HOUSMAN: It's probably good. I see what you're saying. It's probably a good idea just to make -- you know, I've had that kind of experience, too, actually.

INTERVIEWER MADISON: I think we can go off.

INTERVIEWER ULLRICH: We can go off the record.

(Whereupon, the foregoing matter was concluded at 5:28 p.m.)

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 DR. DAVID E. HOUSMAN

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.

_____

M. Rudoff
Official Reporter
Neal R. Gross and Co., Inc.