Deletion to be made on p. 105

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IN THE MATTER OF:

THREE MILE ISLAND SPECIAL
INQUIRY DEPOSITION

DEPOSITION OF SYDNEY W. PORTER, JR.

Place - Ardmore, Pennsylvania

Date - Friday, October 5, 1979 Pages: 1 - 204

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THE NUCLEAR REGULATORY COMMISSION'S :
:
SPECIAL INQUIRY GROUP :

Oral deposition of SYDNEY W. PORTER, JR.

APPEARANCES:

Brownstein, Zeidman & Schomer
by: John F. Dienelt, Esquire
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For the NRC Special
Inquiry Group

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1800 M Street, N.W.
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For Metropolitan Edison

ALSO PRESENT:

Oliver D. T. Lynch
Frank J. Miraglia
Lewis Battast

TAKEN AT:

Porter-Gertz Consultants, Inc.
76 Rittenhouse Place
Ardmore, Pennsylvania 19003

Friday,
October 5, 1979
10:00 a.m.

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PROCEEDINGS

SYDNEY W. PORTER, JR.

was called as a witness and, having been first duly sworn by Mr. Frank J. Miraglia, was examined and testified as follows:

BY MR. DIENELT:

Q Would you state your full name and business address?

A Sydney W. Porter, Jr. Porter-Gertz Consultants, Incorporated, 76 Rittenhouse Place, Ardmore, Pennsylvania 19003.

MR. DIENELT: Will you mark this letter as 3050.

(Whereupon, the Reporter marked the copy of a letter to Mr. Porter as Exhibit 3050.)

BY MR. DIENELT:

Q We have marked as Exhibit 3050 a copy of the letter which was sent to you. I understand that you haven't received the copy that was sent but that you have had a chance to look at the copy of the letter before the deposition began; is that correct?

A Yes.

Q Do you understand the letter?

A I believe I do, yes. I have not been served with a subpoena that I know of.

Q We haven't subpoenaed you because we understand

that your participation is voluntary?

A That's correct.

Q Let me also respond on the record to one concern that you expressed off the record. You will receive a copy of the transcript of the deposition to review and to make any changes that you deem necessary in it. But let me warn you or caution you that if you make any changes which would be regarded as substantial or substantive in nature as opposed to correcting a misspelling, those changes could be deemed to affect your credibility. So, it is important for you to understand the questions that I ask or one of the other gentlemen ask and to give as full and complete an answer to those questions as you can.

If you don't understand a question, please let me know and I will try to rephrase it or clarify it for you. Also, if I could ask you to let me finish the question before you answer it even though you know what the question is. That way the court reporter will be able to get down a clear transcript.

Do you understand?

A Yes, sir.

Q You have testified or given a deposition or an interview previously to investigators from the I&E Branch of NRC, is that correct?

A That's correct.

Q You were interviewed on 3 separate occasions?

A That's correct.

MR. DIENELT: Will you mark these as 3051, 3052 and 3053?

(Whereupon, the Reporter marked transcripts of interviews by I&E with Mr. Porter as Exhibits 3051, 3052 and 3053.)

BY MR. DIENELT:

Q We have marked as Exhibits 3051, 3052 and 3053 transcripts of 3 interviews by I&E with you. I understand that you have not had a chance prior to today to review those transcripts?

A That is correct.

Q At the time that you gave those interviews were the answers which you gave to the questions asked you by the I&E investigators as full and complete as you could recall at the time?

A Yes.

Q Can you recall at this point anything that you said during those three interviews which after having completed the interview you felt needed to be corrected or clarified?

A No. But I can recall that the questions were of such -- many of them were such broad scope that many of them were not complete answers. They were just to the best of my knowledge at the time. And I was not asked to go back and

to look at any of the records that I had, et cetera, in order to give more complete answers.

So, I knew that many of the answers were, in fact, not complete. But I was not asked to complete them. And they did have a chance to ask me that. They had me back two more times. But they did not ask me -- each time I came back they had other questions for me rather than, you know, re.owing old ground.

Q Can you recall any specific areas which you felt were incomplete?

A No. I can only recall that they were there. And if you are really interested in this, then I will have to spend some time and go back over these. Sorry to be so vague, but we are talking about 6 months ago.

Q In addition to the interviews that you had with I&E have you since the time of the TMI accident been deposed or given testimony or given an interview which was transcribed to anyone else?

A Oh, yes.

Q Could you tell me what other occasions you have had?

A The Presidential Committee had many questions.

Q Was that a deposition that you had or an interview with them?

A Interviews. A number of interviews.

Q Do you know whether those interviews were transcribed or tape recorded?

A I'm not sure because there were a number of them. They came in on a number of different occasions.

And also there were a number of telephone interviews, many.

Q Again with the people from the President's Commission?

A Yes. Also, testimony has been given to the Susquehanna Valley Alliance. They had 50-some questions as I remember. And, you know, a good quarter of them or so I had input into.

Q Were these written questions to which you responded in writing?

A Written questions with written answers, yes.

Q You said you had input into the answers to the questions. Who was the party principally responsible for answering the questions?

A Okay, just a minute. Thomas Baxter is the lawyer that was coordinating the answers to these questions. Tom and Ernie Blake together.

Now, people -- in other words, I was just assigned questions to answer. And then people would go over and then maybe they'd take 2 or 3 answers and put together the best story that they could on certain things. The questions

unfortunately many of them were broad. They lacked specificity. And many of them we had to go back and ask questions about the questions even to begin to answer them. They were so broad in nature.

Q Who is "we" in this context?

A Okay, we, Bob Arnold, Jim Mudge, Don Nitty, Ron Williams, John Hilbish, Tom Potter and myself.

So, we were the group who were answering these questions. And many, many hours were spent trying to answer the questions.

The problem is they took the attack of going through the technical specifications and not understanding the tech specs, asking questions about them.

Q "They," the Susquehanna Valley Alliance?

A The Susquehanna Valley Alliance. And, therefore, it is very difficult to answer alot of these questions.

A number of them were questions that started off like when did you stop beating your wife kind of questions. And they were very hard to answer those kinds of questions.

You understand the nature. They were very antagonistic kinds of questions. And they are hard to answer when they are not specific.

Q What is the Susquehanna Valley Alliance, if you know?

A Oh, that's a group of people -- I believe it is a

grass roots from the people in the Lancaster area that were very anxious about their water supply and the contamination -- the possible contamination of their water supply and some inflammatory -- some, many inflammatory news articles about the fact that Metropolitan Edison was going to dump the water from the Unit 2 containment into -- directly into the Susquehanna River. And, you know, news articles like that just simply flame the -- these people's apprehensions.

A number of very bright lawyers joined together. The problem is that the lawyers did not have specific training in nuclear area. And so, therefore, even though they are probably good questions from a technical point of view, many of them are quite poor and quite difficult to answer.

Q As you understand it, did the Susquehanna Valley Alliance address the questions to Met-Ed and GPU?

A Okay, let me see.

Three Mile Island Reactor,et al, are the defendants in this, okay?

MR. DIENELT: Are these answers to interrogatories?

MS. RIDGWAY: It sounds like they are.

BY MR. DIENELT:

Q Is that what they are?

A Yes, it is a lawsuit.

Q As you understand it --

A Civil Action Number 79-658.

Q The answers which you helped to furnish are in the form of answers to interrogatories? Is that what you understand?

A Yes.

Q Did you sign the answers to interrogatories yourself or did someone else sign those answers?

A I don't know that -- Let's see how these were signed. I don't know that I have -- I don't know if I have a signed copy of this.

In other words, this was not -- I believe that I signed my answers to the interrogatories that I furnished to the law firm of Shaw, Pittman, Potts and Trowbridge. I signed my answers to the interrogatories. But some of them were given with the idea, in fact, that I could only cover the portion that I felt that I was technically competent to do and that we needed some meteorological input into this or we needed other input which I felt that could better be done by other people such as Tom Potter or Keith Woodward.

And so, my part of it were signed and were given, you know, in typed form. And I notice some of them were used in toto. Others obviously they cut down, you know, They abbreviated what I had to say, et cetera.

Q From the interview with I&E, your interviews with

the President's Commission and the participation you had in the written submission in connection with the questions of the Susquehanna Valley Alliance have you had any other occasion to give an interview or sworn testimony with respect to the Three Mile Island incident?

A Yes. There have been a number of calls from Senate and House Committees where I have just been told by the lawyers to go ahead and answer them as best I can. People have wanted clarification on points. People have wanted to know where certain numbers came from, how they were derived. There have been just numerous, I mean many, many of these. Not just a few, but dozens as a matter of fact. I don't know, Senator Hart's committee is just one of them.

Q Have you in fact given a statement or testified before any federal or state legislative body with respect to the Three Mile Island incident?

A I have. I have furnished answers to management for that cause. There is one now -- there is a House Select Committee that I just furnished answers on tritium releases to, for instance, and doses,anticipated doses from tritium releases. I don't know when that is actually going out. Do you? You are familiar with what I am talking about?

MS. RIDGWAY: Yes.

THE WITNESS: I furnished my answers directly to Bob Arnold on that. There is -- and the other thing is that my group at Three Mile Island put out a monthly report on effluent releases, liquid and gaseous releases from both Units 1 and 2.

And these reports are the basis for the reports to the Commission on the same subject and other broad -- many of the broad reports that Metropolitan Edison has had to make up for one reason or another.

As you know, we are under more than one lawsuit. And these are used as a basis for many of these actions that are going on now.

I am not knowledgeable as to what all the lawsuits are and where all of this information has been used. But we have put out a monthly report since the first day of the accident, essentially, to management. And then management has used these.

And most of the data that you see in the radiological portion of the summary report to the Commission, three of which have already been sent, you are familiar with those, the summary reports to the NRC from Met-Ed that is put out April 15, June 15 and July 15, are the nominal dates on those.

Okay, the last section on those which is the radiological effects, so to speak, area, we do not do the

meteorology. But the measurements are done by -- are performed by my group, okay.

Q What is your current position with Porter-Gertz?

A I am the president of the company.

Q Do you happen to have a resume?

A Yes.

Q Is it possible to get a copy of that and make it part of the record?

(Discussion off the record.)

THE WITNESS: Very briefly I am a certified Health-Physicist and I have 23-years experience with nuclear power reactor Health Physics and other associated Health-Physics in the fields of radiobiology and measurements.

BY MR. DIENELT:

Q Do you know how many certified Health-Physicists there are in the country?

A By number?

Q Yes, sir?

A No.

Q Approximately?

A I can make it part of the record. The list is in here. Do you want to make the list a part of the record?

There are 1, 2, 3-1/2 pages of certified Health-Physicists. Now, I don't want to stop and number them. But here are the certified Health-Physicists in the country

right now.

Q Do you know approximately how many nuclear power plants have certified Health-Physicists on their staffs?

A No, I don't. I would -- You can get the answer to that from the EEI Health-Physics Task Group. But I wouldn't have that. The Edison Electric Institute Health-Physics Task Group would be able to give you that answer.

I would hazard a guess that probably less than a quarter of them. That's a guess. And it is not a very educated guess because I am only really familiar with the power plants in the Middle Atlantic States.

Q And those power plants, can you approximate the percentage which have at least one certified Health-Physicist on their staff?

A I would approximate maybe 20%.

Q Does one --

A Pardon me, does on the staff mean either headquarter staff or plant staff: correct?

Q Yes, sir.

Does one need to pass a written examination of some sort to become a certified Health Physicist?

A Yes. It is a very difficult written examination.

Q That is the manner by which you became a certified Health-Physicist?

A Well, first of all you have to also -- you have to be eligible for certification. And, so there are strict educational and experience requirements that are checked out quite carefully before you are eligible. And then you are eligible for part one. And then with more experience you are eligible to take part two. And the -- No, strike that.

Q Is it possible to get certified without an examination?

A It was at one time. There was a grandfather clause many years ago.

Q Did you become certified by virtue of the grandfather clause or by virtue --

A No, by virtue of examination.

Q During the period beginning on March 28 I understand that you maintained a log or diary of your activities which took the form of tapes which you dictated roughly contemporaneously with those activities; is that correct?

A Yes. I just used the time when driving from TMI to my hotel room or the few times that I drove back to my home in Wynnewood. I used that time to dictate some tapes because I knew that, you know, recordkeeping was very difficult during the early days. And I would want to look back on these things and learn some lessons from the

difficulties we were having.

Q You furnished those tapes to the I&E investigators?

A Yes, I furnished a typed transcript of those tapes which was unedited, I might add.

Q Do you still have the tapes themselves?

A I believe, yes. I believe most of them I have here, yes.

Yes.

Q It appears that there are as many as 8 of them?

A 11 of them it looks like. Although, actually I am not sure about that. I will have to look at this one. But I think, yes.

Q Was the transcript of the tapes which you furnished to I&E a complete transcript of all the tapes which you have dictated?

A Yes. Now, I have not had a chance to go through and to -- alot of my notes really don't make sense to anyone but me. I had not had a chance to go through and try to make the comments make sense. And so that some of the comments are not going to make sense. And probably what would be more useful to you is if I go through and take the comments -- I was not -- I naively was not expecting anyone to be interested in these except for me when I made them.

The other thing that you need to know is that

normally these tapes were made after about a 20 to 22-hour workday. And therefore, I was edgy and used a few 4-letter words in these tapes when I was annoyed at something that was happening at the time.

Q Did you retain a copy of the transcribed tapes which you furnished to I&E?

A Yes, I did. This is in my office at Three Mile Island.

MR. DIENELT: Off the record.

(Discussion off the record.)

MR. DIENELT: Mr. Porter has agreed to furnish us with a copy of these transcripts of the tapes which he furnished to I&E. He has also indicated that he would like to annotate or edit the transcript so that it would be more easily understood. We have asked him and he has agreed that if he does do that he will also furnish a copy of the annotated tapes.

BY MR. DIENELT:

Q Apart from the tapes and the transcripts of the tapes which was later prepared did you maintain any notes or other documents during the time beginning on March 28 which would reflect your activities?

A Let me look at something here.

There were many memorandum put out -- many memoranda put out having to do with the meetings with the Pennsylvania

Bureau of Radiological Health, Pennsylvania Bureau of Water Quality concerning effluent assessment.

We invited the NRC to all of these meetings. And they did, in fact, attend. So that they were fully aware of the meetings that we were having with Pennsylvania State.

The other major product of the effluent and environmental assessment group at TMI was to put out monthly reports concerning these assessments. Also available -- By the way, the summaries of these assessments are in the monthly TMI accident status reports which were furnished to the Commission May, June, July.

Q Do you have the memoranda that you prepared or that you assisted in preparing relating to effluents? Do you have copies of those memoranda?

A Yes. They are at Three Mile Island, yes.

Q What was the time period during which those memoranda were prepared?

A Well, as I remember the first one was for April and May -- excuse me, the first one was for March and April together since there was only 4 days in March. And then there has been one out each month since then. And they come out about a month late, so to speak. It takes about a month to get all the data together. Sometimes it's more than a month late depending on the circumstances.

We have also prepared the 6-month effluent

release report. You are familiar with the standard report that each power plant has to submit every 6 months? That was also prepared by my group.

And, of course, that is -- We have to go back and get alot of composites for that. And obviously, that is a difficult report to prepare during an accident situation.

And, so, that slowed down our normal monthly report considerably getting that report out.

That is another report that we prepared and that has been docketed.

Q Other than reports which are submitted to Met-Ed or to some other body did you during the time that you were involved in responding to the accident or in the recovery operation maintain for your own use any notes or diary or log apart from your tapes?

A Dozens of memos to different people about different subjects.

In other words, we, you know, were an active group. We were performing many dose assessments, special dose assessments. We performed the dose assessment on the chemist that handled the original primary coolant samples.

For instance, that was a many man-month job. We eventually had to go to Monte Carlo calculations in order to come up with the total doses from those solutions. As

you know, those solutions read much in excess of 1,000 R per hour per cc. And therefore, the survey meters were off scale. And, so, therefore, we had to calculate the exposure from those solutions.

And so, this is a long, difficult investigation. We are now -- we performed a number of beta exposure investigations, skin contamination investigations. A number of special investigations on personal exposures is what my group has been performing and are in the process of performing now.

Q Did you maintain anything like a calendar or a diary which you wrote down the activities which you have done or the things that you were going to do during this time?

A We have files with all our memos in them essentially. You know, when you have a group of 4 or 5 people the diary would be unwieldy. It would be too large.

Q I understand that. My question is whether you maintained a diary separate from your files, a personal working diary or personal working file in which you recorded your activities?

A No. I'd say the major activities were summarized at the end of each month and sent in with the bills. These were just -- this is an overview. This is like a 3- or a 4-paragraph overview of the activities.

Q These are the bills you submitted to Met-Ed?

A Right. This is a 3- or a 4-paragraph overview. The memos were sent to many, many people throughout the organization. And we keep complete files.

And we understand that we may not dispose of these files without the NRC's written consent to do so.

Q Who is "we" in this context?

A "We" is my entire group. In other words, we are all under written orders to keep these files, you know, do not dispose of these files. And anyone from the NRC can come up and go through them at anytime they wish.

Q These files are at Three Mile Island?

A Yes. And they have -- There are literally dozens of NRC people come through -- and go through these files.

Also other, HEW, FDA, DOE. I forget all of the acronyms from the government agencies that have been up there to do this.

Q Do you have a resume?

MR. DIENELT: Would you mark that as Exhibit 3054.

(Whereupon, Mr. Porter's resume was marked as Exhibit 3054.)

BY MR. DIENELT:

Q We have marked as Exhibit 3054 a 2-page document entitled Curriculum Vitae of Sydney W. Porter, Jr.

Is that, in fact, your resume or curriculum vitae?

A Yes, it is. Let me put a date of 1978 on this to show that it does not reflect '79 experiences at Three Mile Island.

Q Apart from the fact that it does not reflect your experiences at Three Mile Island is it an accurate and complete resume of your education and professional experience?

A It is accurate and complete as much as is there.

Q Is there any significant professional experience which is omitted from the resume?

A I do not believe so.

Q Is there any educational training of a significant nature which is omitted from the resume?

A Difficult question. The several dozen courses taken from a Public Health Service Bureau of Radiological Health over the years probably are significant since there were several dozen of them. They are omitted here.

Q Anything else?

A No, not formal education.

Q For what period of time prior to March 28 were you a consultant to Met-Ed in connection with Three Mile Island One or Three Mile Island Two?

A I started my active involvement with Met-Ed approximately a year and a half before Unit One started up. There were a few things that were done earlier than that.

but not very significant I don't believe. We were -- we have always been a consultant to them since the days when they were putting out the Unit One FSAR. But it was about a year before it started up that we became actively involved with the design of the environmental monitoring program.

And then it was around the time of startup that we were actually involved in complete rewrite of the emergency plan which was a continuing job, by the way. It continued for several years.

And since startup we have been actively involved in helping to rewrite some of the operating procedures.

And we have also been quite actively involved in the calibration interpretation and use of the installed radiation monitoring system.

MR. DIENELT: Would you give me that back. I didn't hear it. Just that last answer.

(Whereupon, the Reporter read the answer referred to.)

BY MR. DIENELT:

Q Are there any other major activities prior to March 28 in which you engaged in connection with your responsibilities as a consultant to Met-Ed?

A My firm has been responsible for many years now for the interpretation of the radiological environmental monitoring data and also a fair amount of the non-radiological

environmental data. Dr. Gertz can be much more specific about the non-radiological environmental monitoring data since that is his area of expertise and not mine.

Q Any other major activities that come to mind at this point?

A The design of some education programs having to do with personal exposure, bioessay, new concepts in health physics such as ICRP 26, Report Number 26. Some white papers that were done for the Atomic Industrial Forum on behalf of Metropolitan Edison having to do with low level effects of radiation, many technical reports in the area of effluent monitors such as the noble gases and water white paper which was submitted to the Commission.

If you want more specifics they can be furnished. I will just simply have to go back over our technical report file which we have one just for Metropolitan Edison.

Q Would it be fair to say that the list or summary activities you gave me would encompass the major activities in which you engaged as a consultant for Met-Ed?

A Yes.

Q Were you engaged in writing or rewriting or giving advice with respect to Health-Physics procedures?

A Yes. Yes, it is my opinion that a consultant should not do all the writing of an operation Health-Physics procedure, though. I think they can help write it. But the

operational procedures have to be written by the people that carry them out. And therefore, I was very careful not to take too active a role in that. Just to look at them and to rule on the adequacy of the ones that I was asked to rule on.

Q You first became aware of the accident on March 28th as the result of a telephone call with Mr. Seelinger, is that correct?

A No, I first became aware of the accident as the result of a telephone call somewhere between 8:00 and 9:00 in the morning on March 28th from Michael Buring from the staff health physicist in Reading.

Q How long after that phone call did you speak to Mr. Seelinger?

A All right, I have to think back. I received a number of phone calls in the morning where we were redesigning the environmental monitoring program to step it up to an emergency status program. And at that point I was told that they didn't think they needed my services, that is by Mr. Buring in Reading. And I asked if I could go to Salem Power Plant because of the fact that 3 or 4 people had flown down from Kenberra (phonetic) in Connecticut. And I was meeting there on a radiation monitoring status for the Unit 2 Salem Plant. And, you know, since they had flown all the way down and were waiting for me I asked if I

couldn't spend a few hours at Salem. And they said, "Yes, go ahead."

And so, I drove down to the Salem Power Plant which takes about 2 hours and stopped for lunch on the way not being fully informed of what was happening at the plant because the people at Reading weren't really at that point fully informed. And when I arrived there there were like half a dozen phone call messages from people, most of them from Seelinger who asked me to come to Three Mile Island as soon as possible.

Q You arrived at Three Mile Island sometime in the early evening on the 28th?

A Either late afternoon, early evening. After I got an update on what was happening it was obvious to me that one of the things that I could do was to bring some of the equipment and trained personnel with me up there from Salem as well as respirators and other things they needed.

So, I spent almost an hour and a half at Salem after I got these messages getting the equipment they needed, respirators, respirator cartridges and a gathering of people, getting permission to bring people with me. The reason for this is that the Salem people were trained with almost the same emergency procedures and same instrumentation and use of the instrumentation as TMI people were. Therefore, we could bring their van up full of

emergency equipment and put them out in the environment immediately. And all they needed was someone to show them where to go. And they could pick up with no problems in logistics at all. And that's why I wanted to get the people from Salem because they could be used just as if they were TMI personnel.

So, that's why I spent that hour and a half rather than coming up right away. Because I knew that a) the people were tired, they had just come out of a long outage. And b), they had been up since early in the morning. Everybody had been called in early in the morning. And that they were going to be exhausted soon and they had to be replaced.

And so, I spent that time doing that, calling up the Berwick plant, SSES, Susquehanna Steam Electric Station personnel, asking them to come down. Because I was thinking, what am I going to need 5, 6 hours from now and how do I get it there. And so, I just started organizing in my mind and bringing in these replacements of people that were trained and could do the job.

One of the problems early on is that we had an awful lot of knowledgeable people that arrived and a), they didn't know the procedures or the equipment and, you know, it is just too difficult under emergency conditions to start training people. And so, I got the

best people I could to come help us in order to make outside environmental measurements.

Q It was Mr. Seelinger who asked you to come to the plant, is that correct?

A Yes, there were some other phone messages. I don't remember -- there were some other people. I think in Reading, too. At that point they said, hey, please get up here.

Q When you spoke with Mr. Seelinger from Salem did he tell you what specifically your role was to be?

A Only very generally. I got that more specifically when I arrived at the observation center and went directly in to see Jack Herbein.

Q Did you have any written agreement or understanding with respect to what your role was to be in connection with an emergency at TMI?

A My written agreement or understanding was that since my group had participated in the writing of the plan and the debugging of the plan, so to speak, that we would just be available to help them in any way we could.

I also believe that our contract with TMI states that we will perform environmental monitoring services for them in both normal and, if necessary, emergency -- on emergency status. It is very general terms, not specifically, no.

Q When you were on your way from Salem to TMI did you have an idea in your mind as to what your role would be?

A I think the only idea I had at that point was that since I knew the people, the plant and the installed monitoring system and the emergency plan that I would help out where I saw that I needed to help out. And I did not have really a predisposed -- I just -- as I was given problems I did my best to solve them. And I was given a few problems over the phone and early in the day having to do with environmental monitoring program. These were solved.

I was given a call they needed respirators. That was solved. And so, I was just given little pieces of information. And I did not have enough information at the time that I was driving up there. I just started thinking about equipment. I started thinking about the fact that this accident should continue there are going to be breakdowns of equipment. We are going to need more people and more equipment. Where can I get that equipment? Where can I get the people?

And so, I started organizing just for the off-site monitoring was the thing they asked me specifically about. I started organizing, okay, how will we continue the off-site monitoring. And I did stop on my way up. Called the State of Delaware who I knew had some extra dual channel analyzers

that were set up exactly the way TMI's were and asked the State of Delaware to bring one up, too, as well as the ones that were coming from Salem.

I was just thinking about people and equipment for on- and off-site environmental monitoring as I was going up. And I was also thinking about the fact that thank God we had people not at all connected with the plant that were performing the normal environmental monitoring sample pickup because that was a Godsend. And this is all I can remember thinking.

Q Do you recall whether you and Mr. Seelinger when you talked to him from Salem had talked about environmental monitoring or off-site monitoring?

A Environmental monitoring had first been talked about by Michael Buring in a series of calls in the morning. Seelinger essentially said things are worse than we originally thought. Get up here right away. And he said something about taking a helicopter.

And he said that a half an hour after the 2 helicopters had left Salem, by the way. Murphy's Law again.

But it was better that I took my own car anyway because as it turns out I used the car continually.

Q Before you left Salem had you talked to anyone other than Buring and Seelinger, anyone from the site?

A I don't remember. It's possible there were

a number -- I remember having a number -- there was a stack of messages which is unusual to come to one plant and have a stack of messages from another plant rather than just one. And I don't really remember whether I called anyone else in the meantime or not. I made a number of phone calls about respirators and respirator cartridges. And exactly who I talked to at the plant at the time, communications were difficult. It wasn't the easiest thing to get through to people. And often I can remember spending 5 minutes identifying myself before they even -- the operator would even put me through to who I needed to talk to.

And so, there was that usual small confusion factor that you will have in any emergency. And I can't really remember now. I am sorry.

I don't think -- whatever it was, it wasn't that significant in my memory.

Q When you arrived at the observation center you indicated that you talked to Mr. Herbein?

A Yes.

Q Did you talk to anyone else at that time?

A Oh, yes, there were alot of people there. Dave Limroth was there. I talked with him. I can't remember -- I talked with the people that I knew were making the decisions. And I just let them know that I was there. And the major thing that Herbein said, he was obviously very busy, was that

he said, "I want you to take care of effluent assessment. And right now we need you in Unit One Control Room to help with the on- and off-site monitoring teams. Go over there, think about how you are going to take care of effluent assessment and make sure that your people back in Ardmore are set up to expand the off-site normal environmental monitoring program." And that's the crux of what he told me.

Q Was Mr. Limroth present when Mr. Herbein told you that?

A I don't know. Dave was in and out. In and out. I just -- I cannot remember now. I'm sorry.

Q Did Mr. Limroth give you any instructions or make any requests of you regarding what you would be doing?

A You are talking about on my initial arrival?

Q Yes, sir, at the Observation Center?

A I think he did. I had to get Dave's permission to get on site. I remember that. And in getting that permission we had some discussions. And I really cannot remember those discussions now.

Is there something -- I&E people must have debriefed Dave Limroth on that. I just can't -- I can't -- I did interface with Dave. Now, I can't remember when I interfaced with him. In other words, I had a number of talks with Dave. But the question is when. And if you are talking about when I initially arrived, I remember

interfacing with him when I arrived. And I remember getting overall instructions from Herbein. And I probably got some instructions from Dave, too.

Q Do you recall whether you received any instructions from anyone else at that time?

A Well, I certainly did when I got into the Control Room.

Q Let's focus for the moment, if we can, on the Observation Center.

A Sometime early on to the accident, for 6, 8 hours that I was there I interfaced with Dick Dubiel and Tom Mulleavy.

Q This was after you left the Observation Center?

A Well, I can't -- I'm trying to remember whether I was able -- I know I wanted to talk to Dick to let him know I was there, let him know what I was doing. I remember trying to get in touch with him. I couldn't initially get in touch with him. Now, whether I got in touch with him before I left the Observation Center or after I got over to the Unit One Control Room, I don't remember. And also where I first met up with Tom Mulleavy I don't remember.

But they both -- I saw them both early on or I talked to Dick. I didn't see him early on. I saw Tom Mulleavy early on. And I saw whoever it was, the EDO in the

Unit One Control Room right away. And I got directions from them upon arrival in the Unite One Control Room. And I cannot recall the exact sequence of events as far as whether I talked to them before I went to the Control Room or after I went to the Control Room.

Q Can you recall approximately when you did go to the Unit One Control Room?

A It was early evening. It was within like an hour, hour and a half of my arrival. I had to jerk around with security things and get my name on the north gate access so I could not be hampered by, you know, the hundreds of reporters that seemed to be around. And I just remember doing that so that I could come in and out. And remembering that I wanted to have my car available so that when we got those very important samples from the Unit Two stack radiation monitoring system I remember that I wanted to be able to get the samples to the counting labs off site. This is all very early decisions that were made that maybe we had 50 MR per hour in the counting room. Therefore, the counting room is useless. Therefore, how are we going to access the effluents. Therefore, I have to have an off-site lab. Therefore, how do I get these samples -- A and B, how do I get them to the off-site lab. Answer is they are going to get lost if we are not careful. Therefore, I will personally take them there and make sure that they get

counted by our off-site lab and by the NRC lab. And I'd better do the first few of these personally just to make sure that the system gets started and that there is some QA in the system because later on everyone is going to want to know what happened, you know, what the effluents were.

And all of this was going through my mind early on as to, you know, what are my biggest problems going to be and how am I going to overcome them. And the thing is who I called exactly when is -- it is just too far along the way.

Q From the time that you arrived at the Unit One Control Room until April 1st, did the nature of your responsibilities change?

A I would say that they changed in the fact that as I asked whether certain things were being done and they weren't done I would just get back to somebody to try to see that they were, in fact, being accomplished. And so, I was trying to think about the, you know, the big health physics picture on personal exposure and internal dose assessment. And so, I was -- oh, yes, one of the other things Jack Herbein said early on was that do a -- you know, perform a quality assurance on the plant personal exposure, see if we are doing things properly. And so, as I hit problems I would try to solve them. And so -- And in solving problems, yes, your mission changes because an area

you don't think is a problem, then when you look into it it is a problem, well, you talk to a couple people. I knew the plant. I knew, you know, who, you know, in general who had what responsibilities normally. And if I would get to them and see if they were working on this problem.

And so, therefore -- therefore -- see, we had early on problems that there were certain things that we needed. We needed to have a whole-body counter that was operational. We needed to have off-site GeLi detectors that were operational. We needed to have sample coordination. And so that the 2 main functions were QA for the health physics program and effluent assessment. And all I was doing was just kind of looking to see, okay, are these being performed. You know, who is doing what and what is needed to be done. And then people would say, no, that isn't being done. And so, I would just turn to the EDO and say, should I do this as I was going through in this sort of QA function.

See, there were certain things that were assumed. And when we want to do them the assumptions weren't really correct. And therefore, the problems had to be solved.

Like we had assumed that we had an operational whole-body counter since there was a whole-body counter sitting there on site and had been there for months apparently. We assumed that, okay, this was useful and ready

to go.

Q And who was "we"?

A I think just the plant personnel in general, you know, assumed that it was useful and ready to go. But, okay, but then when I looked into it, hey, that whole-body counter is parked right next to the Unit One buildings, right in one of the major downwind directions of the plume is useless where it is. The background is much too high for it to be used. So, we will get it moved.

So, somebody said get, take care of doing that. I remember calling IMC that night sometime and saying there is going to be shift change at 7:00 o'clock in the morning. There are a number of people I would like counted. Can you have somebody up here at 6:30, or, you know, can you have somebody up here early so that by 6:30 you have a) mooted and 6) recalibrated it so that at the 7:00 o'clock shift change I can get certain people whole-body counted.

And that was important because of the fact that we were not able to take breathing air samples in the Aux. Building during those early days.

And so, this is a long-winded answer to your question. But what I am trying to do is to say that sometimes when you hit a problem that seemed like it was solved this problem wasn't solved for half a day. And so, I spent alot of time solving that problem.

Q I have put a box on a piece of paper with your name in the box. Can you draw for me on that piece of paper the line of authority up from you as you understood it when you arrived at the ECS in Unit One on March 28?

A I reported to the ECS Coordinator who reported to Herbein.

Q As I understand it the ECS Coordinator changed from time to time?

A Yes. Every 12 hours he changed.

Q Do you recall who the different ECS Coordinators were?

A Bill Potts was one of them. Lexy Tsaggaris was one of them. I believe that Tom Mulleavy was one of them.

Q Now can you draw for me the chain of command beneath you if there was one?

A Not really as far as command is concerned. Later on -- At what time do you want to talk about?

Q Again when you first arrived on March 28th at the ECS?

A Now, I acted as an advisor. So, therefore, there was no real chain of command. In other words, I was used to working with people that were used to working with me. They knew what I was capable of doing. And when they needed to do something I got requests from other people. Also, there were other people over in Unit Two that would call in

and ask things, too. I would get requests from Seelinger to help with a procedure. I remember on there were some procedures that he wanted to look at. I got requests directly from NRC people for information very early on, too. So that there were alot of people coming in with requests, too.

So, we had the people from Unit Two calling over, people from the NRC and the Watch Engineer's Office coming in with requests for information just because they knew that I was just helping to coordinate things there in the ECS.

Q Before you arrived was there anyone filling the function that you filled when you did arrive?

A Yes, to the best of our ability it would be Dick Dubiel in Unit One and probably Tom Mulleavy in Unit Two. Excuse me, the other way around. Dick Dubiel in Unit Two and Tom Mulleavy in Unit One.

MR. DIENELT: Let's mark these 3055.

(Whereupon, the Reporter marked a drawing by Mr. Porter as Exhibit 3055.)

BY MR. DIENELT:

Q We have marked as Exhibit 3055 the page on which Mr. Porter has indicated the people who were above him in the chain of command. Please correct me if I am misstating you, Mr. Porter, as well as on the side of the document the two boxes with arrows to indicate that he received

requests to do certain things from the Unit Two Control Room and the NRC?

A Well, the NRC was more requests for information rather than to perform. They didn't give me requests to go do things. They just wanted information.

Q The NRC requested information but Unit Two requested you to perform things?

A Yes, to perform functions. And the people in Unit Two -- I can remember Seelinger asking different things early on, calls from Miller asking for things. And those are the two people I can remember early on from Unit Two asking for specific things to be done. And also there was a flow of information back and forth. I just simply talked on the hot line, Unit One, Unit Two Control Room hot line, talked to Dubiel over there on a number of occasions or whoever was filling his -- or taking his place when he was off.

Q Am I correct that when you received a request from Unit 2 to engage in certain activities you went ahead and did that and did not seek the permission of the ECS Coordinator to do that?

A Well, usually what I did is to say I have been asked to do such and such. I tried as much as I could. I tried to keep the coordinator always informed of what I was doing. Because that's really his job is to be on

top of what is happening. So, you know, in the practical health physics area. So, I -- if I was going to leave -- I had a little desk there in the Control Room. And if I was going to leave the Control Room I'd always let him know where I was going and what I was doing because I felt it was important that there be one person that was aware, you know -- what the plan says. He is the guy that is supposed to coordinate these things. And therefore, I kept him aware of what was happening. And I asked permission before I would call off-site people that would commit funds of any kind or ask for work to be done, you know, from off-site people. I always checked with him first before I did any of that.

Q For what period of time beginning on March 28 did the organization which you have drawn on Exhibit 3055 remain the same insofar as your role is concerned?

A About the first week and a half.

Q How did it change after that first week and a half?

A Well, after the first week and a half the levels off site had been demonstrated to be so low, both the gamma levels -- the gross gamma levels and also the iodine and the halogen specific activities were so low that -- and things became more of a routine in the Control Room. And therefore, I was able -- and also the other things that changed then

were that we had a very specific health physics organization. And they were starting to take over things like specifying people for whole-body counting, you know, reviewing whole-body count results. Alot of the things I just picked up in the early days to make sure that they were performed. As these people -- we had to -- you know, by that time there were several hundred people in at least to help in these areas. And they had been here long enough so they were beginning to get a handle on a) who they needed to talk to and b) how to do what they knew they had to do. And so at that point I was able to spend less time on the quote health physics QA and more time on the effluent environmental assessment which was becoming more and more complex with time, too, by the way.

So, I eventually in that time period spent less and less time with the ECS coordinator. I would just maybe check in with him each day. And I would spend more and more time in the Observation Center where I had started the nucleus of the effluent environmental assessment on-site group.

Q In your role with the effluent assessment group to whom did you report or from whom did you obtain any instructions or guidance?

A Okay, I got -- mainly Herbein because he was there in the Observation Center. But also I kept Dave

Limroth appraised of what I was doing. And I tried to keep Dubiel and Mulleavy appraised also of what I was doing.

They -- Dubiel and Mulleavy, I know them quite well. And essentially they knew, you know, that I could do it and do it properly. And, therefore, it was a matter of my informing them of anything unusual that was happening more than getting them day-to-day kind of things. But what I would get is, I would get requests for, hey, we think we want to, you know, vent a bleed tank or we want to do this. Would you come up and help perform the assessment of the consequences of this release, help put some information into the RWP, Radiation Work Permit.

And so, there would be -- I was continually in the plant, out of the plant. And then as exposures began to mount for the plant people that were getting the very important charcoals from HPR 219 I started to go and to get some of them myself. And for two reasons, a) I wanted to share some of the exposure, and b) while I was there I wanted to do some other things with the radiation monitoring system to see whether or not it was going to be possible to get some useful data out of it. This is maybe a week after the incident started.

I can remember going in and, you know, going in with a Scott Air Pak into the Aux. Building to collect the filters so that we'd have a better written procedure on just

it should be done so that it was done properly. And also to -- I remember going in specifically with cans of trichloroethylene to try to decontaminate the detected areas, try to clean the halogens off of the detectors so we could get those units back in service to see if it was possible to decontaminate them. I wanted to make the attempt to get the -- to get useful information from the RMS system as soon as possible. And I was unsuccessful in this, that we had such played-out problems with iodine that it was obvious that, you know, there was a generic problem that we were not going to be able to solve under those conditions. But I wanted to make the attempt to try to clean these out to get useful information on the iodine channels for our stack monitor.

Q You testified a moment ago that approximately a week and a half after the accident there was a Health-Physics organization that had developed or been established; is that essentially correct?

A It had been established earlier than that, by the way. But it was really getting on its feet at that point.

Q Who was in charge of that?

A Well, there was -- there were two Health-Physics organizations, really. There was an on-site organization which was essentially Dubiel was in charge of. Mulleavy in his absence.

And there was an off-site health physics organization which came on-site in order to give -- to have numbers of people to do essentially routine monitoring and many, many other important Health-Physics functions. And that was being run by a fellow by the name of Bill Graber from Electric Boat Company. Again under the direction -- under the very close direction of Herbein and Limroth both. In other words, Limroth also. Herbein and Limroth were running that together.

Q Would it be fair to say that the role that you played beginning on March 28 and continuing at least for a week or week and a half was primarily the role of a trouble-shooter?

A Yes, I think that's a -- I also have the environmental assessment thing which I had to make sure certain samples were taken at certain times. And they were very, very difficult to get these samples. But I had the effluent assessment and I had a trouble-shooter role. And then the third role was to make sure that management was informed of the results of the off-site environmental monitoring program.

So, these were all three important roles that -- and so, I just interfaced with my people here in Ardmore on the off-site data from the environmental monitoring program which was then called the emergency environmental

monitoring program.

Q With respect to the nontrouble-shooting role is it your testimony that your chain of command was first to the ECS director and ultimately to Herbein?

A During the first week of the accident you are talking about now?

Q Yes.

THE WITNESS: Would you read me the question again. I'm not sure I understand it.

(Whereupon, the Reporter read back the question referred to.)

THE WITNESS: It's a long time back. And things change with time. And so, I am really trying to focus back in on that time.

I'd say ECS director and then combination of Limroth and Herbein.

BY MR. DIENELT:

Q After the first week would it be fair to say that your reporting responsibilities in the nontrouble-shooting role were directly to Herbein and Limroth?

A Yes, with the responsibility to keep Dubiel and Mulleavy informed of what was going on which I felt was a very important responsibility. And I tried to keep them aware of what was happening all the time so there was some coordination. And also, there were a number of things that

I needed help from their people, too. And so, there was alot of interplay there.

Q With respect to your trouble-shooting role is it fair to say that you reported to or you dealt with whomever it was that asked you to look at or solve a particular problem?

A Yes. But I kept going back to the ECS coordinators, the person that was right there on the spot. And I also for important items made sure that Herbein understood. And if Herbein wasn't there then Limroth or Sandy Lawyer was sort of taking the off-watch from Herbein as I remember in the early days there. And so that if Herbein wasn't there it was Sandy that I would bring up a particular problem that I felt needed to be solved then and there. And especially if it was a commitment of a significant amount of funds or people. Then I wanted to make sure that management understood that,"Hey, I think this needs to be done and it needs to be done now. And do I have your permission to go ahead." Because I felt, you know, communication is difficult in an emergency. So I tried very hard to make sure there were several people that knew what I was doing, not just one person.

Q How frequently, if you can give me an approximation, did you talk with Herbein, Limroth or Lawyer during that first week?

A Oh, quite frequently. Let me see, say at least half a dozen times a day. And it depends on whether I was -- I felt I was making progress on the job that I was trying to perform or whether I was being frustrated in trying to perform it. And I had to go higher in order to get the horsepower I needed in order to get it performed, too.

Q How frequently during that first week did you have contact with Mr. Dubiel?

A Infrequently. I talked to him on the phone. I saw him very few times because he was mostly in Unit Two Control Room. And I was mostly in Unit One Control Room and in the Observation Center. So, we were physically -- our paths did not cross. Now, I would pick up the hot line from Unit One, Unit Two Control Room and ask to talk to Dubiel or Mulleavy. And sometimes I would see him and not say anything because I can remember going over early and doing a couple quick thyroid checks on the people that had been in the Unit One Aux. Building with the SAM Two Dual Channel Analyzer. And I can recall walking by him with a suitcase of equipment in my hand and going like that because I had to catch these people before they went off shift. There were you know, important time restraints. And so, I don't remember seeing him very often at all.

Q Did you speak more frequently during that first week to Mr. Herbein or Mr. Limroth or Mr. Lawyer than you did

with Mr. Dubiel?

A Yes.

Q Did the frequency of your contact with Mr. Dubiel remain the same after the first week?

A Let me think about that.

When you say Mr. Dubiel, do you mean Mr. Dubiel/ Mr. Mulleavy?

Q Yes. Let's say Mr. Dubiel/ Mr. Mulleavy, the person who was in Unit Two Control Room who was in charge of health physics. Would that be a fair characterization? Mr. Dubiel/Mr. Mulleavy?

A Yes. Okay, now you are asking whether I interfaced with them more during the second week than the first? Is that the essence of your question?

Q That's right.

A I honestly cannot remember that.

You had a reason for asking it. Do you want to try to get to what you are after here?

Q I'm not sure that I did have a reason for asking. I am just trying to find o t what the facts were. There is no great ulterior motive involved.

Would you say that you spoke to or had contact with Mr. Dubiel or Mr. Mulleavy more frequently than once a day during the first week?

A Yes. Yes, I would say it was more frequently than

once a day or whoever was in charge of health physics over there at the time if someone else happened to be standing in. Because I picked up that hot line just many, many times for one thing or another. And often I wouldn't talk to them but I would talk to someone who would ask them a question because they were busy. But they could answer a quick question for me. Do you understand?

So that this second-hand communication is still communication.

Q During the first week what person did you have the most frequent dealings with or what position did you have the most frequent dealings with?

A I would say the ECS coordinator. It's a combination of -- a combination of people that I talked to there in the Control Room. It is not only the ECS coordinator but it was the nuclear engineer that was up there. And it was the Health-Physicist that was up there. And so, it was that group of three people that I had -- that I talked to most often during the first week.

Q What person or persons as you understood it during that week were in charge of in-plant Health-Physics, if any?

A Would you define what you mean by in-plant Health-physics for me so I understand the question better?

Q Who was responsible for the insuring that procedures with respect to Health-Physics and radiological

protection were followed within the plant?

A Well, ultimately it was Dick Dubiel/Tom Mulleavy that was really responsible for Health-Physics. There were a number of people that were trying to do alot of the logistics for them, getting warm bodies with survey meters in their hands to make measurements and getting -- making sure that personal dosimetry was being carried on, whole-body was being carried on. The number of things that could be done -- performed just off-site versus just on-site.

And so that's why I asked my question. Because a number of the functions that were normally performed on-site were being performed off-site as far as Health-Physics was concerned. So, that's why I asked the question.

Q You said that ultimately Mr. Dubiel/Mr. Mulleavy were in charge. Was there a period of time when someone else was in charge or when no one was in charge prior to the time that Mr. Dubiel/Mr. Mulleavy were in charge?

A No. What I mean to say there or what I should say there is that they were spending a great deal of their time with Unit Two specific problems. And therefore, a number of things they ordinarily would have attended to personally that other people were attending to. And therefore, the breach was being picked up by Dave Limroth. Who, by the way, in the chain of command was Dubiel's boss

back then. And by the Graber -- what I call the off-site Health-Physics organization because their comm d center was off-site. You know, just off-site.

And so, life is complicated when you are -- the areas where you normally perform functions are off limits in order to perform those functions. And so -- and that's why I am having a difficult time answering your questions because I am thinking back on -- okay, now who was in charge of the Health-Physics per se, and that's why I asked you to define Health-Physics for me. So, I guess I am ending up defining certain responsibilities for you and saying that the personal exposure portion and the internal chmmeter evaluation portions of this were being performed by the Graber organization starting the first week into the incident. And I was involved in making sure that we had the proper equipment and proper procedures going during the first few days. And then as soon as there was somebody to turn it over to I turned it over to them.

Does that answer the thrust of your question?

Q I think so. Let me try to clarify it. Are you saying that for the first several days you filled the role that Mr. Graber's orgarization subsequently filled?

A Only initially. The first two days about. Only very, very initially. All I did is just to make sure that things were being, you know that their -- you know, that we

were properly recording pocket dosimeter readings, that we were keying on the proper people to have whole-body counted. All I wanted to do was to assure myself that this was happening. And to assure myself that it was happening I went to the whole-body count. I looked at the list of people. I questioned the actual operators, "Who has been in the Aux. Building today? And how long were you there? How much exposure did you pick up while you were there?"

I personally questioned the operators during the first couple of days in order to come up with, all right, who should be whole-body counted kind of thing until the Graber organization got his feet on the ground and was able to take this over for me.

There were just -- there were, you know, there was early Health-Physics QA that had to be performed.

(At this time a recess was held.)

BY MR. DIENELT:

Q During the first several days after March 28 as you understood it who was in charge of personnel dosimetry?

A When Michael Buring arrived on site he took it over. Now, I cannot remember when he arrived on site to take that over. And I believe, but I'm not sure, that it would have been whoever was running Health-Physics from the Unit One Control Room I think had the ball until things got straightened out. There were a number of people working in

it. The procedure for setup, and it was -- it was working. In other words, we were getting data. The TLD's were being read out the way they should have. And there was an interim period where it was just running itself waiting for Buring to get there to take it over.

But my best answer is that ultimately it was Health-Physics that was in charge of personal dosimetry.

Q Did Mr. Buring arrive before or after you did?

A After.

Q Your testimony is that prior to the time that he got there the person, if any, who was responsible for personnel dosimetry was the ECS director?

A No. I think it would have been the Health-Physics rather than ECS director.

Q That would have been the person in the Unit Two Control Room when you say the Health-Physicist?

A No. It would be the -- Well, ultimately it was the person in the Unit Two Control Room. But I am interpreting your question as to who was keeping day-to-day tabs on personal dosimetry. Is that a correct way to interpret your --

Q Yes.

A And the day-to-day tabs on the personal dosimetry were being taken care of -- by the Health-Physicist that was in Unit One.

Q Who was responsible to the ECS director?

A Yes.

Q Who was in charge during this period of exposure control?

A First two days is the period in question?

Q Yes, sir.

A For the first two days to the best of my knowledge it was Dubiel/Mulleavy.

Q Did that situation change after the first two days?

A The Graber organization took over exposure control a few days into the -- see, we are not defining the word in charge. And that's where my difficulty here is.

After the first two days the Graber organization began to take over a number of things that had to be taken over by someone else in order to allow Dubiel to stay in the Unit Two -- with the Unit Two problems -- plant problems. And exposure control was taken over by the Graber organization. And I cannot remember exactly what day that was that that got shifted over. I just can't remember that specifically.

Q Is your understanding of the phrase in charge that person was the individual ultimately responsible for insuring that certain things were done?

A Yes.

Q During the first two days do you know who was

actually performing the functions related to personnel dosimetry?

A Which functions are you referring to?

Q Reading the TLD's, issuing the TLD's.

A Okay, the -- we called in very early in the game Harshaws themself came in to -- with their own readers to read TLD's the first couple of days into it as far the performance of reading it. In fact, we had Art Lucus their top physicist.

Q Who is "we" in this context?

A I can't remember who called. I remember having discussions about calling them in and the fact that, hey, you know, we have got to get help. Let's get the best. And let's get him right now and have him fly in and do this.

And it was very early that we had Art Lucus with his top dosimetrist from Harshaw. I forget her name now. But boy, she was good. And we had the best that could be obtained right there with their best equipment in order to have them start reading these things out. And I cannot recall the timing on that. I just remember that it was very early that that was set up. And they were doing that because I remember looking at the readouts. Each day I would go in and look at the readouts. Then I would cross that with the pocket dosimeter numbers that I got because there were certain people that I was following because they

were what I would call maximum individuals. They were the people that were at highest risk. And I was personally following those for about the first three or four days I followed those people.

And then I would cross with the TLD readouts to say, "Hey, does this look reasonable? Are these exposures reasonable?" I remember being amazed that the exposures were as low as they were, as a matter of fact.

And I also used that as a cross-reference list to come up with the people that needed to be whole-body counted, too. And so, this is what I recollect. Now, I cannot recollect at what day the readings were being performed by Harshaw.

I do know that we were going by pocket dosimeter readings for the first couple of days as far as limiting exposure. I cannot remember when we had the first TLD readout. But I can remember that the pocket dosimeter, you know, levels in general were not high.

Now, there was one case where they were off-scale. And we all knew about that. But except for the nonproblems, you know, he was just told, "Don't go back in."

And except for that one known problem -- I can't remember the details is what I am telling you. I am pulling together what I can pull together. And I can't remember when we had our first TLD readout which we were all anxious for.

But we went with pocket dosimeter readings up to then and whole-body counts to make sure that we were not getting any substantial. internal burdens.

And I can remember in general being surprised that a) the exposures were as low as they were and b) being very surprised at the fact that we were not getting any substantial internal body burdens. Because I knew that the halogen levels were quite high which meant that the oxygen breathing apparatus was being properly used by the people. And that's what you always worry about when you send somebody into an unknown high-level halogen field. You always worry about the fact that is the mask leaking? Are they getting anything internally? And that's one of the things you worry about.

Q Was the first TLD reading that you recall made by Harshaw?

A I don't know who it was made by. That's why I was fuzzy on the point.

Q Was there someone who was recording the results of the pocket dosimetry readings?

A Oh, absolutely.

Q Do you know what person was doing that?

A Yes, the guard force was assigned that. And they were recording the pocket dosimeters of everybody that went on and off-site the first couple of days. And see, it

was those lists that I was looking at as well as questioning people. In other words, I would go to the Unit Two Control Room and question the Aux. operators, the people that I knew that had to go down and read certain valves or, you know, perform certain functions.

And I questioned these people. And I would talk about, "Well, who went in with you?" And it was this personnel -- I wanted to make sure that I wasn't missing anybody that could have had any kind of substantial exposure.

I did personally just question these guys in order to come up with the lists of people to be whole-body counted.

Q Was there anyone other than yourself who was during the first several days reviewing the results of the pocket chamber readings and attempting otherwise to find out what the exposures had been?

A Yes. There were other people. I was not the only person looking at these. Early on the Graber organization did. I'm not quite sure how early they did that.

We interfaced for a couple of days until I was kind of satisfied that they had the ball and were running with it. And at that point I dropped out of that and went to other things.

Q Anyone other than the Graber organization?

A Yes. I can't remember who it was. I was not the only person that was looking at these things. It might have

been -- somebody else in Health-Physics was doing this besides me because I remember having discussions with him. And I don't remember who it was. There was somebody else in Health-Physics that was also doing the same thing. And I thought to myself, "Boy, it is good to have a cross-check from somebody in the plant."

Q It was somebody who was on the Met-Ed staff?

A Yes, somebody on the Met-Ed staff was also doing this.

Q Did you discuss the work that you were doing in connection with reviewing the readings from the pocket chamber with Mr. Dubiel at the time?

A No, with Mr. Mulleavy I did. With Mr. Dubiel I did not. Mr. Mulleavy, you know, said he would inform Mr. Dubiel with what was going on. I remember discussing this with Tom Mulleavy.

Q Was there someone who asked you to do this or did you simply go in and fill a void that you perceived existed?

A I am having a hard time remembering that. I remember telling people that I was doing it. In other words, the EOC -- excuse me, the ECS coordinator, he knew I was doing it. But I also informed Herbein that I was doing it. So that -- and Limroth that I was doing this.

I was doing it as kind of that overall Herbein,

this was good instincts, said, "Hey, do a QA check." And it was part of that QA check. And I was just picking up on this.

In other words, it was somewhat of a duplication of effort. But I think in an emergency situation an important one.

In other words, the -- Mulleavy knew I was doing this. And the ECS coordinator knew I was doing this, too. So, I was not just doing it in a vacuum if that is what you are asking.

Q During the first several days who was performing the functions related to briefing and planning for personnel who were going to take samples in the plant or perform repairs in areas which might expose them to high levels of radiation?

A I don't know who was doing that on the 29th which is the date you are interested in; isn't it?

Q As well as the 28th, 30th, 31st and so on?

A Well, the thing is, the real high samples were taken on the 29th. I was not aware of the fact that they were taken until after they were taken. And so, it was not me. And so I didn't know about that until after the fact as a matter of fact.

Q You don't know who, if anyone, was responsible for that or was performing that function on the 29th?

A I assume it was Dubiel. I do not know who it was.

Q After the 29th who was it?

A I am trying to think how that was being done.

I had alot of input into the RWP for the second set of primary coolant samples that were taken because of the exposures during the first set and because of the fact that we also knew how hot it was down there. What I did -- I am trying to think -- I am just reconstructing from memory in my mind. I knew that there had been some problems after the fact with taking the samples. I didn't know the extent of them. But I knew there had been problems. I knew that the exposures were potentially high. And I am trying to think how I did this.

I took the procedure of taking samples, broke it down to 5 discreet steps that 5 separate people could do to perform. I wrote out a proposed RWP procedure for taking the sample. I can remember calling Hershey Medical Center and getting in a lead glass shield, the thing that was developed at NRTS after the SL-1 accident, you know, the lead glass shield with steel on the bottom on wheels? It is a shield, a dolly on wheels with a lead glass window so that you can work with very high-level samples. And the only thing that you get is extremity exposure, hand exposures.

And I can remember calling up Hershey Medical Center because I knew that one had been placed there by the plant

and saying, "Get that down to us right away because if we were to take another sample I want that there. I want to take it around that. I want to take it and I want people to practice, to go in and practice the procedure."

And I can remember coming in with all these suggestions. And I believe I gave these suggestions directly to Seelinger as a matter of fact. Either Seelinger or Miller, one or the other. They were asking for suggestions on this thing. And I wrote out a list of things. And I said, "Hey, first of all 5 people should share the exposure. And secondly, you need a mock-up and a practice."

And so the management was directly involved in that RWP at the very top.

Q Did they implement the suggestions that you made with respect to the RWP?

A Yes, they implemented them. Signed the -- I remember they assigned the training to Bill Pitka a very fine chemist, radiochemist. And as I remember there was really minimal exposure the second time around on that because it had been properly thought out and practiced and rehearsed.

That's the best I can answer your question.

Q During the first two days do you know what kind of control, if any, was exercised with respect to the issuance and collection of either pocket chambers or TLD's or other devices for measuring exposure?

A I believe they were issued -- as I remember they were issued by the guard force. And you simply were not allowed off-site without logging in your dosimeter readings. And I am remembering -- I am trying to remember about TLD's. I think people might have kept their TLD's for awhile. That is fuzzy. I cannot remember specifically the TLD's for the first two days.

Q Did you have any role at any time after March 28 in designing the system or consulting anyone with respect to the system which was employed with respect to control of the issuance and collection of these devices?

A Well, I can remember that there was a certain amount of confusion about the whole TLD system. And I can remember going to management and saying, "You need the guy that designed the whole system down here to run it. And his name is Michael Buring. And he works for Pennsylvania Power and Light Company. And get him down here right away in order to take over the thing and sit on top of it."

And I can remember making that strong statement to management saying, "Get him here and get him here right away." Then I remember that I -- I remember looking at it and not really being satisfied with everything that was happening and saying there was one guy that can correct it because he designed it. He implemented it. He has more knowledge than any other living soul about it. Get

him here even so he works for somebody else and have him take it over. And we will sort out the logistics later on.

I can remember being very strong and positive about that. I remember it happened.

Q Do you know who you made that recommendation to?

A I think that I went in -- As I remember I went in to make it to Herbein. And Herbein wasn't there. It was one of his few absences during the first few days. And I made it directly to Sandy Lawyer who was -- who had the watch for Herbein. Because I remember there was a certain amount of confusion there. The problem is I don't remember what day I made this on. But I do remember that very early on I saw that we needed the guy with -- that could take the whole problem and put it to bed and make it work. And we needed him there right away.

Q What was the nature of the confusion that caused you to make that recommendation to management?

A Well, there was a readout that I looked at, TLD readout. I remember looking at it. And there were a number of obvious errors on the readout. And I asked -- I started asking questions about it. And I could not get reasonable answers to my questions.

And in those days I had a very short fuse which everybody that dealt with me tells me about. And I remember saying, "There's only one person that can fix this

on a timely manner. Get him here." And that was Buring.

And the poor guy was drafted in. And he was working 20 hours a day like I was after that. But the point is it fixed it. And it fixed it expeditiously which was what had to be done.

But the readout was not satisfactory. And I did not want to go into why it was not satisfactory. But I questioned the people that were responsible for it at the time. And I did not get the answers I wanted. And I saw right away that to sit down and educate those people was going to take a long time. And it was not practical under the circumstances to do that.

The most practical thing is to get the one person in who could fix the whole thing. And that was Buring. And Buring is a very well-qualified Health-Physicist, both with plant and also he worked on management staff, too. And he is the guy that designed the program that they were having problems with, with computers, see.

So, he was the person that could just come in and do the whole thing. And there was no group of consultants or experts from any other place that could do it. And that's why I really made a strong demand to get him in. That is, there were no group of experts that could do it on a tinely basis without having a long, up-hill learning curve. And so that's why it was important to get the right person in to

do the right job.

And that's what I was trying to do and in those terms because I was making sure that the right person was working on the proper problem.

Q Were there problems other than the TLD readout that you just discussed which led to your conclusion that someone should be brought in like Mr. Buring?

A Not that I recall. I just recall that there was confusion, you know, there was just a certain amount of confusion because of the accident and because of the fact that there were alot of people from off-site knowledgeable as they were that were there trying to do jobs. And I wanted to put the confusion to bed as expeditiously as possible, just confusion about how to get things accomplished, who do I talk to to get this information or that information. And so, I cut through the whole thing. And so there is one guy that can come in, will not be confused, knows exactly what to do and how to do it and who to talk to. And the thing is that it was just a matter of wanting to do things in the most expeditious manner. Not that the people weren't qualified that were there. They were very well qualified.

But the point is that they didn't know the people. They didn't know the specific procedures. And they didn't know where the soft points were. And here is a guy that knew

all of that. So, it was important to get him there. That's all.

Q Did you discuss your concern about the confusion or your recommendation that Buring be brought in with Mr. Dubiel?

A No. I -- This happened late at night as I remember because Herbein wasn't there. And I looked at this, and I remember trying to get to him. I think what I did is just tell Tom Mulleavy, "Tom, I've made the best decision I can. And we are getting Buring in here in order to get the tab runs squared away." That's all I remember about that. I don't remember discussing it with Dubiel per se. I remember saying that -- I was trying in those days not to bring up more problems to a man that was already over-burdened as so many of them -- But on something like this to say, "This is what I have recommended. Do you have any problems with the recommendations." If you call that discussions. And I believe I did that with Mulleavy rather than Dubiel. But there was somebody I got back to somebody in the organization there. And I think it was Mulleavy. I just said, "This is what I recommended. Do you have any problem with the recommendation?" Answer, "No." On to the next problem.

Q Do you know how people who were working in the plant particularly in the Health-Physics area were made

aware that Mr. Buring was in charge of the TLD's at the time or after he became in charge of them?

A No. You have got to remember that he was in charge of the readings and the processing and the issuing and not of saying, "Who needs a TLD," et cetera. In other words, there was again -- Mike Buring was at the Observation Center. And there were two groups of operational people. There was the on-site group of operational people. And what we did was to perform as many functions as possible off-site because anything we did on-site we paid a dear price for in exposure, in confusion, in difficulty of trying to accomplish the job.

So, you know, one of my early tasks was to say, "What can we do off-site? Let's get it done off-site." Off-site but close in, if that makes sense.

And that was the early wrestling of problems that I had was to make sure. And if you read the testimony you will see that I had problems with vendors which I guess you can expect. And we wrestled with them as best we could.

Q What was provided, if anything, in the emergency plan for the role which Mr. Buring was brought in to fill?

A I am thinking about that question. The emergency plan only provided for a general Health-Physics emergency organization and did not go down into this kind of detail. And the reason for that is that I don't think anybody is

smart enough to know exactly what the nature of the emergency is going to be. The emergency plan has to be general. And that kind of specificity is not provided.

Now that we can Monday morning quarterback we can say, all right, if we have this accident again, this is how we are going to respond. But you know as well as I do, you know, if and when there is a second accident it probably will not be the same accident. And so, we have to do new thinking all over again.

And so the most important thing that we can provide to the emergency plan is general thinking and not specificity. I think specificity channels your thoughts. And that can be very dangerous in an emergency.

Because, an example, the number of people that have been going into containment are whole-line Health-Physicists that only think about gamma exposure and don't think about beta exposure. And we have to be very careful not to have overly-specified emergency plans. Or in my opinion we are going to make many, many costly mistakes which we can't afford to make.

Q Did the emergency plan contemplate that the function which Mr. Buring performed would be performed by someone on the Met-Ed staff?

A Yes.

Q Did the emergency plan contemplate that the

functions which the Graber organization performed would be performed by someone on the Met-Ed staff?

A Yes.

Q Did the emergency plan make any provision for bringing in outside help?

A Yes. We had a list of the emergency plan contemplated that we would need outside help. What it did not do was to specify precisely and exactly how they would be used. Because again, it is my opinion that we are not smart enough to say what the accident is. And you have to be careful about over-specification in an emergency plan.

In fact, we had a list of Health-Physicists from -- the Health-Physicists and Radiochemists from all the neighboring PJM interconnection plants, and the equipment they could bring with them, the amount of time it would take for them to get there with equipment and without equipment depending upon whether they were called from the plant or from home.

And so, this was all thought about. And we had times, names, home phone numbers of these people that was kept up to date. And the idea there was that we would bring in, you know, knowledgeable, experienced reactor Health-Physics people and then put them to work as best we could put them to work depending upon the nature of the emergency. It lacked specificity beyond that.

Q' Were there any general tasks or types of tasks which the emergency plan contemplated would be done by outside people rather than Met-Ed staff?

A Yes. Specifically it was assumed that Radiation Management Corporation which was a company that came into being for emergency preparedness for the PJM Utilities of which Met-Ed is one. It was assumed that Radiation Management Corporation would furnish their entire staff of experienced people in Health-Physics, exposure control, exposure evaluation, whole-body counting, TLD dosimetry. And it was envisioned that -- and also medical expertise and medical evaluation of exposures or suspected exposures. And it was envisioned that this outside organization in toto would come in and give help in any of these areas where it was needed. And that's the major reason for the existence of Radiation Management Corporation.

Q Would it be fair to say that what the emergency plan contemplated was that Met-Ed staff would remain in charge of various functions such as the TLD function which Mr. Buring ultimately performed?

A Mr. Buring did perform that when he was at Met-Ed, by the way. And it is just happenstance that he happened to have disassociated himself a few weeks before the accident. Otherwise, he was at the Reading office. And he would have just come down and automatically taken it over.

Q Someone had replaced Mr. Buring at Met-Ed?

A No, they had no replacement for him. See, he had just left. And they had not hired a replacement for him yet.

So, there was a breach there. And that's why he was the obvious person to come in and fill the breach.

Q Would it be fair to say that the emergency plan contemplated that a Met-Ed staff person would be in charge of that job and that the outside assistance which was brought in during an emergency would support or assist the Met-Ed person who was in charge?

A In general I think that is fair to say that.

Q Would it be fair to say that the emergency plan did not designate an area of responsibility and contemplate that the area would be taken over by an outside individual or an outside group?

A I think that is fair to say that.

Let me say that in my answer to that I think of myself as an extension of Met-Ed management since I have worked for them for so many years and having worked with the people. In other words, I have more knowledge about alot of the functions on-site than certain of the people that are now, you know, newly on-site that have newly come on do. And so, therefore, with certain exceptions of contractors that have been there for years and that have performed

functions and because I am not a Met-Ed employee per se, but I have performed certain functions for them. And so that, you know, B&W did certain things that they had to do and evaluations that you would expect B&W to do because they have always done them. And so, that is the caveat that I am giving you to that answer, is that there are certain contractors that normally do perform certain functions for utilities. And if that is their normal job, then you expect them to come in and do that and more if and when there is an accident.

Q Was it your normal job to do the effluent assessment?

A No. It was my normal job to help with the effluent assessment, though.

In other words, I did not perform the effluent assessment at all during Met-Ed. Strictly an inplant function.

Q Was it your job to be in charge of the effluent assessment normally?

A No. My job in the early days was to advise how the effluent assessment should be performed, how we should take composite samples, what the difficulties were involved in taking these composite samples, what backups we should use, alot of things like what volumes we should use. In other words, I did alot of the technical thinking that went into the procedures. But I did not write the procedures.

Q When you say the early days, do you mean the early days of the accident or do you mean the early days of Unit One or Unit Two?

A Early days of Unit One, 1963, '64. I did alot of thinking about how do we composite samples for effluent assessment.

Then we had some problems with the installed radiation monitoring system. I did an awful lot of thinking about the use of the radiation monitoring system, the set points of the radiation monitoring system, the weakness and strengths of it, the calibrations. In other words I was technically involved in evaluating -- a trouble-shooter is a good word. I did alot of trouble-shooting. Just helping the staff trouble-shoot as far as the radiation monitoring system was concerned.

And therefore, when they had problems with the radiation monitoring system then they turned around and said, "Hey, is there anything we can do?"

Q Did the emergency plan contemplate that you would be in charge of effluent assessment or in charge of any other activity during an emergency?

A The emergency plan did not contemplate anything so specific as this. And I had alot to do with writing the emergency plan because I did not think any emergency plan should contemplate that one individual should be irreplacable

for anything. Because I don't think that is the wrong way to write an emergency plan.

Suppose I was in Hawaii at the time. You know.

Q You have testified that you recommended that Mr. Boring be brought in?

A Yes, because see they were weak in that area because he had left. They didn't have a replacement brought on board yet.

Q Did you make recommendations that any other outside help be brought in to take o or perform a function that the emergency plan contemplated would be performed by Met-Ed staff?

A Oh, definitely.

Q Would you tell me who the other persons you recommended be brought in were and if they were brought in?

A First of all I answered this in part of an earlier question that my -- from the limited information that I had, from a few phone calls the morning and afternoon on the 28th of March, that I saw right away that there were people -- there were 4 emergency teams out there making surveys on and off-site. And these people had to be spelled. They just couldn't stay out there ad infinitum. And so, therefore, the first thing I thought about was, okay, we have to bring in people that are trained in the same procedures, same equipment. And I told you about that in an earlier question.

All right, so there is one example. The second thing I thought about is the whole-body counting of people and the use of a gamma spec lab to analyze samples which was all important. We had to have that and have it right away.

So, I talked to the EDO, got permission from the EDO to call Radiation Management Corporation and have someone sent up the next morning to perform the whole-body counting.

Unfortunately, there were alot of problems with that. But the point was that their whole-body counter was already on-site. The next available whole-body counter was halfway across the country kind of thing

And so, we had alot of eggs in that basket. And there was a comedy of errors involved on RMC's part.

They had the thing jacked up with hydraulic jacks. And you had to start the motor of the truck in order to lift the hydraulic jacks to move it. And no crane or anything could lift it because you would break off the legs of the jack and collapse the trailer if you tried to pick it up with a tow truck to move it. So, we had to have the motor running. And the man they sent up didn't have the keys. And it had some kind of German -- you know, Murphy's Law. They couldn't hot-wire it because of the fact that the fuel pump was some foreign manufacturer. And they didn't know the voltages involved.

And RMC jerked around and jerked around. We didn't have a whole-body counter until -- we didn't have it at 7:00 in the morning. And I think we had it at 7:00 in the evening. But not a whole lot before then.

But there were problems. Even so, the whole-body counter was on-site. There were problems with getting it pushed off-site so that we could use it, you know. Big problems which I was furious about.

But I am just, you know, focusing back on the fact that you make the best recommendations as you can. It doesn't mean they are going to work.

The other one which is an important one is that we had to have a gamma spec off-site system because of the fact that the counting lab was useless on-site. The one we had because of the noble gas background was so high that the on-site gamma spec laboratory was not useful at all where it was. The background was so high that at that time it was excessive. And it simply couldn't be used.

So, at the same time in the evening of the 28th I called RMC for the whole-body counter. I said you have got an emergency van, put your portable gamma spec system in there and get it on-site. And they promised that at 6:30 a.m. they'd have a whole-body counter on the 29th working. And at 10:00 a.m. they had a gamma spec system working. And they blew it on the gamma spec system and didn't have one

until the next day, sometime the next afternoon. It was a whole day. It was a real mess on that one, too.

But luckily we were able to get the NRC came in with their gamma spec system. And for the first day we used their gamma spec system for analysis of samples until we had RMC and SAI arrived almost simultaneously with their portable lab. So, we had both SAI's and RMC's right off-site at the Observation Center with their mobile counting labs. And these were very important.

Q Were there any other outside people whom you recommended be brought in who were, in fact, brought in to take over a part of the operation?

A There was a joint decision made by me and some other people because we had a discussion about it. And I can't remember the other people, about bringing in SAI, Science Applications Incorporated.

Specifically we wanted Charlie Pelletier there and Jim Kline. I specifically wanted those two individuals there because of their knowledge of ion species, and their knowledge of power plants or knowledge of the measurements of ion species and their analysis capability which I knew they had this portable van. And so -- But, I didn't do the calling. Someone else called them. All I did was just talk to someone and say, "We have to have them here because I want to be able to document for the record the efficiency for

organically bound iodine for every single air sample that we take. I want Pelletier to document it. So that we can say that we have the best that is available as far as measurements of halogens are concerned."

And Charlie oversaw all of that earlier ion species work personally and had a great deal to do with, you know -- In other words, it was very, very important that I have people like that in an emergency because one of the first questions that comes up is how do you know you are measuring all of the iodine? How do you know 80% of it isn't organically bound or you are not measuring it?

I personally know of no one who can do a better job than Charlie Pelletier in answering that question. And from both experience and knowledge and equipment he is one of the best. And so, it was important to get him there early because of the questions I knew would be coming up about iodine. They weren't there yet. But I knew they were coming. And they did come, as you know, in spades about a month later.

Q How soon was SAI brought in?

A They were there in a couple days. And I don't remember exactly how soon. It was two to three days that they were there.

Q Did you recommend that Mr. Graber or his organization be brought in?

A No.

Q Were you consulted with regard to that?

A No.

Q Do you know who did? Who was responsible for bringing Mr. Graber in?

A I was told it was upper management. And I don't know whether it was Met-Ed or GPU. I was just told upper management brought Mr. Graber in there.

Q Were there other outside people or organizations aside from Mr. Graber who were brought in by persons other than you or -- Oh, by the way --

A Oh, I am sure, yes. The list I gave you is not a full list. And I would have to go back over notes. I do remember saying that we needed a meteorologist Pickard and Lowe and to help with the dose assessment to make sure that the Met tower is working properly and we had all the meteorological data. And I asked that, you know, I wanted to make sure that they were brought in early so that they had an overview there. I remember specifically asking to make sure that they were here.

Q Who did you ask?

A I don't know. Somebody in management. I remember specifically asking to make sure. And I think the answer was, "We h[illegible] already called them, by the way."

I'm sure that your investigation is going to point

out the fact that there was a certain amount of duplication of effort in trying to get a horsepower on board, you know. That, you know, I'm sure will be obvious to you when you finish your investigations. And I can remember being pleasantly surprised seeing certain people that were there.

But I was certainly not consulted on all the people that needed to be brought in.

Q The emergency plan contemplated I take it, the meteorological function would be performed by Met-Ed staff during an emergency rather than by an outside group such as Pickard and Lowe?

A Well, the towers worked fine. There was, in fact, not a problem there. All I was doing was saying that in case we have a problem let's have the people that designed the system right here rather than having to bring them in and maybe somebody -- the guy that we need is on the West Coast or something like that. There was not a problem there.

And as a matter of fact, for that -- we really didn't need them there for that. But I just wanted them there in case we did have a problem. As it turns out, the Met tower worked fine. And one can question whether they had to be on-site for that particular reason.

I was trying to foresee problems before they happened to us rather than continually respond to problems. And there were a number of people that were on-site for that

reason, too, by the way, that were never needed. But it was comforting to know that they were there. And when they were there, then you could think of other things that they could help think about.

There were a number of think tanks that were worked up there just because the people were on-site. The emergency plan, again, did not go into this kind of detail.

Q Mr. Graber took over a role with respect to off-site activities which the plan contemplated would be performed by Met-Ed staff; is that essentially correct?

A Yes. That is essentially correct. Not completely, but essentially.

Q What I want to know is whether there were other people like Mr. Graber or Mr. Buring who came in and performed a function or were in charge of a function which the emergency plan contemplated would be performed by Met-Ed staff?

A I believe that if I can define Met-Ed staff as Met-Ed/GPU staff I think the majority of those functions were supervised by Met-Ed/GPU staff.

Now, you have got to remember that I was, you know, knowledgeable only about certain HP and effluent assessment functions. And I can't talk about all the functions at all. I cannot remember any. There might have been some. But I cannot remember them.

(At this time a luncheon recess was held.)

SYDNEY W. PORTER, resumed

BY MR. DIENELT:

Q During the first week of the emergency did you have any role in controlling access to the Auxiliary Building?

A I am thinking about the question. Not that I am aware of, no.

Q Do you know who was responsible or in charge of control of the Auxiliary Building?

A You are referring to the Unit Two Auxiliary Building, I take it?

Q Yes, sir.

A Unit Two Control Room.

Q Will you outline briefly what the procedure you recommended and which was implemented for taking samples of the primary coolant after March 29 was?

A Yes. I just want to look and see if I happen to have any of this early stuff. Excuse me just a second.

I wrote it down. I remember definitely giving it to Unit Two Control Room. And I believe it was Miller, Sterling or both. One or the other, not both. And I remember discussing it with Don Collins, by the way, too.

I don't have a copy of it here. I will recall it to best I can.

The procedure itself was to break down the steps in taking the primary coolant sample into five separate and distinct actions that could be performed by five separate persons. That was the thrust of the procedure.

The second thing was in my procedure was the fact that it was to be rehearsed, the mockup. There are hoods around that aren't different from the sample sink. And you just rehearse it where you have to reach into a hood and turn a valve and see if they can't use the lead glass, the shielded lead glass shield that was actually made for a surgeon to work on a highly contaminated person. But it is also fine for reaching around and grabbing a valve. See, if they didn't use that -- I didn't want to say you had to use it if it was going to slow you down more than it was going to help you. But the shielded -- the iron shield which shields the trunk and then the glass which shields the face are very useful in cutting down exposure when you are taking very hot samples. And we had two of those at that point in the plant. And so that if it could be used I wanted to use them.

And so, that was the essence of what my input and the fact that I said that it is very important to rehearse what you are going to do so that you are essentially very good at it and that you know at what

point you have to back off and say, okay, I don't want to perform this function anymore because of exposure. And that was the thrust of my proposed RWP procedure.

Now, it was not a refined procedure. And I just asked that there be input from all the applicable people. I can't think of all things. And so, I think the important thing was to sit down and think about it and to rehearse it.

Q Did you review the procedure which had been followed in taking the primary coolant sample on the 29th?

A No, I did not.

Q Did you discuss it with anyone?

A Yes, I do not -- oh, no, I did not discuss it prior to its being taken. I didn't review the procedure. And it became apparent when I ran through the mockup of the taking of that procedure that alot of things were done on an ad hoc basis.

In defense of the plant, there is incredible pressure on these people to get the sample. A great deal from the NRC, I might add. A great deal from the NRC. It was a very important sample that told us about the amount of fuel damage that we had. And there was alot of pressure on these guys to do it. They volunteered. But there was just a great deal of general pressure.

Q Would it be fair to say that if the procedure that

you recommended which was employed with respect to the primary coolant samples after the 29th had been employed on the 29th there would have been either or both less damage or less exposure for the people who took the sample?

A It would not be fair to say that because when the people started the sample on the 29th they had no idea of the levels were going to be what they were.

In other words, we are Monday morning guarterbacking which we are very good at doing. In other words, they thought they were going in to take a sample that was going to be maybe hotter than normal, but not incredibly hot. And it's only after they get into the procedure that they saw that the survey meter was offscale when it touched this.

When the person drew that sample he did not know that he was touching a sample that was that hot until after it was drawn. So, the thing is that we are Monday morning quarterbacking. They went in. There was an approved procedure for how you take these samples. And under, you know, normal or even what they had experienced as most abnormal conditions that was a fine procedure.

Q Was that procedure followed, do you know, on the 29th?

A Pretty well. There was a Health-Physicist there. And the Health-Physicist was making measurements. There were certain things that were not done that should have been

done after they found out how hot the sample was.

But the thing is that for ordinary taking and ordinary coolant samples the procedure was fine. And there was a Health-Physicist there monitoring every step of the way. The thing is that when the coolant samples were found to be so incredibly hot, at that point they should have backed off.

But again, I am Monday morning quarterbacking this. In other words, the procedure was adequate for what they believed the conditions to be. The conditions were not what they believed them to be.

Q Do you know whether the procedure which they followed had as part of it any kind of survey or testing from a longer distance to determine what the radiation level was?

A As I remember Pete Velez went in and checked the general area first with a survey meter, saw that it was hot but not incredibly so they couldn't go in there. Yes, he did that.

And he started monitoring as the sample was drawn. And at that point it was very, you know, we are Monday morning quarterbacking. What happened was the conditions were not what they expected them to be. And they kept going. And if we Monday morning quarterback it, they shouldn't have kept going. They should have withdrawn and discussed it with, you know, with upper management

before they kept going.

But again, this is Monday morning quarterbacking.

Q Who was the Health-Physicist as you recall on the 29th who was monitoring each step of the procedure?

A Peter Velez. He is an HP foreman.

Q Were you aware of the sample which was taken on the 28th?

A There was an early sample taken on the 28th in the early morning I think it was which was not that hot yet. And yes, I was aware of that.

See, that was another thing that mislead everybody. Since that sample wasn't so hot they sort of figured that, well, things aren't as bad as -- Things aren't too bad. And so, I was aware of the fact that they had taken the sample and there didn't seem to be any big problem. But it was hotter than, you know, normal. But it wasn't that hot.

And unfortunately, the people that took the sample on the 29th were aware of that, too. And that channeled thinking a little bit.

Again, it is what I am getting back to is an emergency plan cannot be too specific.

Q Were you involved in supervising the preparations for or the actual taking of any of the samples beginning on the 30th?

A March 30 is what you are talking about?

Q Yes, sir.

A No, that was sort of part of the chain of the 29th and 30th.

Q Did there come a time when you participated in the supervision of the preparations for or the actual taking of samples of the primary coolant?

A I participated in the planning for what we call the second set of samples which were taken some weeks later and which were very well thought out. And I talked about that participation in the fact that broke it down into five steps, talked about the importance of the mockup, the importance of shielding, the importance of ring TLD's. All the things that as soon as you know how hot the sample is, you know you have to do.

Q When did this occur?

A The second set of samples occurred at least two to three weeks after the first set.

Q You were not involved at all in the first set of samples?

A That's correct.

Q You did not write up any procedure which was used between March 28 and April the 5th or thereafter?

A It was the -- It was around April -- It was early April that I wrote this procedure up. And I'm not sure of the date. But I did write it up. And I did discuss it briefly

I remember specifically with John Collins. And he said, "Yes, that is exactly what we have to do."

Q Prior to your writing that procedure up --

A I didn't know that they had even taken the other samples. I was aware of the very first one. I got that word when -- because that had been taken when I came in because I asked, "Have you taken any samples?" I was told, "Yes, they took a sample." And this was it.

And I was not aware that the sample on the 29th was being taken until after it was taken.

See, that was taken like the night of the 29th or the morning of the 30th, as I remember.

Q Was there any procedure other than the one that you wrote up established after the sample was taken on March 29 --

A Well, look.

Q -- for taking additional samples?

A I didn't write the whole procedure. All I did was to outline what should be done.

Q I think we understand what you did.

What I want to know is whether there was any other procedure which you are aware that was in effect between March 29 and the time when the procedure which you participated in developing was put into effect?

A I'm not aware of any. But there very well might

have been. I didn't go and look at the RWP book to see what RWP had been issued inbetween those dates.

Q Do you know whether an RWP was issued for the sample on March 29?

A I don't have those files with me. I believe they were working under an existing RWP rather than a new one.

In other words, there is a general RWP for taking primary coolant samples. And I believe that they were working under that. But I'm not sure about that fact. And I believe they were working under that, under the existing RWP.

I can call my office and get the answer to that question. We have those details are in the accident write-up. How interested are you in the answer to this question?

Q I think we have testimony from other people that there was no RWP for that sample?

A Except for the existing one for taking primary coolant.

Q Whatever existing RWP may have existed, yes.

A Because I am aware of an existing one that existed for just taking --

Q When was that put into effect or when was that gotten? Do you know?

A No.

Q Would it have been a year ago, a year prior to that?

A It could have been, yes.

Q Do you recall what the level of exposure or level of radiation that was reported to you for the 28th sample was?

A No. It was high but not incredibly high. It was nowhere near what the March 29 sample was.

Q Do you recall whether it was 200 R?

A No, I don't recall what it was.

Q Would you regard that as being high?

A R per what?

Q Per hour.

A That's for what volume sample now?

MR. LYNCH: 5 milliliters.

THE WITNESS: Yes, I would regard that as being high. Not -- It is not even in the same ballpark with the next sample. The next sample was an order and a half magnitude above that. That's 200 R per 5 mills did you say?

MR. LYNCH: I want to say 6 inches but I'm not sure. Maybe contact. It's hard to say.

BY MR. DIENELT:

Q In the procedure which you participated in developing for taking those samples was there any provision for determining what the need for the sample was?

A Yes, they did an ALARA review of that.

Q What was that?

A They did an ALARA review, A-L-A-R-A. As low as reasonably achievable. It is a standard NRC term.

They did do an ALARA review for the need of the sample. And it -- And also at that point every procedure after it had gone through the stationary review, the plan operating review committee, what we call the PORC. At that point it went to ALARA. No, it went to PORC first. Excuse me, it went to ALARA first, and then it went to PORC. And after PORC it was reviewed and okayed by the Commission before it was performed. So that this had again, you know, we were looking for the horse after the barn gate had been opened. But the point is that things were set up in a very orderly manner at the point after the 30th for taking of samples. It was very carefully reviewed by all levels of management, both in the Commission and in the Met-Ed organization.

Q I am confused on chronology. I am trying to focus on the period which I thought was around April 10 after a procedure which you helped write was put into effect?

A Okay.

Q Are you telling me that there was another procedure different from the one that was followed on March 28 and March 29 that came into use beginning on March 30?

A No, after March 30.

Q And not until about April 10?

A I think there was no sample taken inbetween. In other words, it was the first few days of April that I wrote down 8 or 10 steps. things that needed to be done. And I briefly reviewed those steps for you. And I showed those to several people and made sure that Seelinger and Miller had these.

Q Am I correct that there was no review of the necessity for taking the samples on the 28th and 29th so far as you are aware?

A I'm not so sure about that. They were -- no, those -- I can remember there was a great deal of discussion of the taking of those samples as far as the need. Great deal of discussion.

Q Were you involved in any of the discussions?

A I'm not sure whether I was directly involved. I know I heard some of the discussions. Now, whether I actually talked to the NRC people before that sample was taken -- Okay, no, I was not involved because of the fact that I really didn't know the sample was taken until after it was taken. I remember everyone, you know, being told about the fact that, you know, they needed a sample. I remember the Commission saying again and again and again, "We have to get a sample. We have to know what is happening.

We need information."

But I was not aware that those samples had been drawn until after they were drawn. I believe Dick Dubiel was.

Q Do you know what the perceived need for the sample was on the 29th?

A I can offer an opinion. I do not know. Do you want the opinion?

Q What is your opinion?

A Okay, my -- See, since I was not really a party to those particular discussions, I just heard about them, the need was that -- the big question was what happened? What happened to the fuel?

Q In the procedure which you assisted in developing was there a provision for taking into account the previous sampling experience and determining what to do and what steps to follow in taking the sample which was about to be take

A I'm not sure. I wrote down 8 or 10 things. And I'm not sure that wasn't just implied.

In other words, all the people I talked to already knew about the readings. See, they took a reading on contact which was offscale. Then they took a reading at a foot and at three feet. And everyone I talked to was already aware of that. And that's why I wrote the procedure

because of those.

So, if this makes sense to you -- in other words what I am saying is that everyone that I have talked to was aware of what the readings were. You know, the foot and three-foot readings from the one CC sample at the time that I wrote those up. That's why I was writing them up was in response to that.

And so, therefore, I don't know that I specifically said, "Think about this." I think I said because of the high levels involved in the preceding this is what is recommended.

Does that answer your question?

Q In part it does. Let me just see if I understand.

You would agree that it is good practice to take into account the previous sampling experience in planning for the next sample?

A Absolutely.

Q You would agree that it is good practice to approach the sample which is being taken in a cautious manner?

A Yes.

Q Particularly when you have a high reading in the preceding sample?

A Yes.

Q You would agree that the sample taken on March 29

in light of the 200 R per hour reading or sample that had been gotten on March 28 should have been approached in a very cautious manner?

A Yes.

Q Would you also agree that the sample which was taken on March 29 was not done in a sufficiently cautious manner?

A Sufficient for what?

Q Protection of a worker.

A I would agree that in looking back on the experience of that sample taken that more caution should have been exercised.

I am not convinced that had I been under the same pressures and the -- and had the same motivating powers that those people had that were trying to 'save the plant as best they could," I'm not convinced that some of the mistakes might not have been made again.

Now, whether -- in other words, what I am saying is that sitting back in the cool light of day they should have had dosimeters on their fingers. They should have backed off from a sample that was offscale. They should have used tongs rather than touching things.

However, if it was my plant and I was one of the chief chemists and I thought my plant was in big problem -- had big problems, I mean really, serious problems and I

thought that, well, maybe I will take an extremity dose of 50 R. I'm not so sure that the cost benefit analysis wouldn't have been as long as it is voluntary, get that information.

Now, we sit back and we say, okay, it should have been five people doing the job that one did right now. And that's how we look at it now. But, you have to go -- you have to work in the environment and the pressures that were there at the time. And these guys were, you know, they were working to save their plant. And I can understand. I don't have to agree with them. But I think I can understand somewhat the pressures that they were under and why they did what they did.

I am aware of an incident at NRTS when two NRC people went into an area they had absolutely no idea how high the level was in order to pull a guy out. And they were saving, you know -- they were saving a buddy. They were taking a calculated risk. And they did not know what the levels were.

Now, people do extraordinary things under extraordinary circumstances. And so, what I am saying is that I'm not so sure if we have another accident with another set of difficult situations that people are not going to take heroic steps in order to accomplish what they feel has to be accomplished at the time. And just say, "Al'

right, I will suffer the consequences."

Q Can you give me an estimate of the difference in time which would have been involved if the procedure that you assisted in developing had been followed on March 29 instead of the procedure which, in fact, was followed?

A Well, I would say that the -- the paperwork alone probably took 4 days to accomplish to get the signatures, to get the thought. Then the mockup was after that. There is alot of time involved in that procedure in just getting everybody to look at it and sign off on it. So, it was the mockup time was probably half a day, I guess. The paperwork was 4 days and the thinking that went into it before then I can't estimate because I don't know how many people's thinking went into it. I only know about my own.

Q From the time that the paperwork had been finished and the thinking had been done and you were prepared to use a mockup how much longer would it have taken to follow the post-March 29 procedure?

A My guess is that it was half to three-quarters of a day by the time we ran through the mockup and decided whether or not the actions were as well honed as they could reasonably hone them. I'd say half to three-quarters of a day. Something like that. That's a very rough guess. I want to underline the word rough as far as that is concerned.

Q What personnel monitoring equipment did you recommend

in the procedure that you assisted in developing?

A Maybe the only thing other than what they normally wear which are the, you know, the proper range pocket dosimeters and the TLD's placed on the body, I believe that the only thing I could remember saying that they should have were wrist or finger TLD's.

Q What was the reason for taking the sample which was taken sometime after March 30 and which employed the procedure which you assisted in developing?

A Well, I guess I feel for the degradation of the fuel. No, there were more reasons. They wanted boron concentrations. There were alot. In other words, there were many reasons. There were a number of things that they needed to know. They needed PA's, they needed boron concentrations. We needed to know how much iodine was going to stay in the solution versus how much was going to go out. I could go on for 15 minutes about all the things we learned from the coolant sample. There were many reasons that were important reasons.

Q Is essentially what you are saying that you needed to update the information you had gotten from the sample that was taken on the 29th?

A Yes. That raised a number of questions which needed to be answered, also.

Q The one on the 29th did?

A Yes. Well, see, we knew that -- I believe that

more boron had been added to the system since then. And there were more questions about the pH, whether or not we needed pH control. There were a number of primary chemistry-type questions that were important plus the fact that very important question of whether there had been further degradation of the fuel had to be answered.

Q Did you have any role in --

A Fuel cladding.

Q -- in supervising what was done with the sample that was drawn on March 29?

A By that do you mean to whom it was sent?

Q Yes, sir, in part?

A Well, I will work with that part first.

No, I knew that there were very well-qualified chemists from B&W that were working on that. And I knew that the NRC had a direct role in that, also. And so that -- And the general idea as I understood it was that there be a series of labs that would cross-check each other because a number of the measurements were difficult. And it was split up into a number of aliquots. And the aliquots were sent to different places.

I did not have a role in who it was sent to. Now, how about the rest of your question?

Q Did you play any other role in the connection with the handling of the sample or the disposition of the

sample after it was taken?

A Yes, I personally reviewed the exposure records of the person that handled the sample and wanted to see. And I personally made sure that they were whole-body counted as I had done when I got the list of the people that were involved in the earlier one.

These were just normal HP -- part of my normal QA check. In other words, people in high risk, I think you'd need to take extraordinary measures to make sure that proper things are performed. In fact, all of these things had been performed. All I did was to do a QA on it to make sure that they, in fact, had been performed or what the normal types of assessments that needed to be made were made.

Q Did you do anything else?

A For the second set of samples?

Q On the 29th, yes, sir.

A On the 29th, yes. On the 29th I was asked to head the group that evaluated the specific exposures of all persons that handled the samples. And in doing that and in reviewing the data we saw that there was some extensive skin contamination that was not removed.

So, there were some beta exposures. And that -- And so, therefore, we had a very difficult -- That is a very difficult Health-Physics assignment. In order to do that

I brought in one of the best dosimetrists in the country, Dr. Joseph Sage from the University of Kentucky who worked on -- with some of the original MIRD data to work on a model that we could use for the beta dose assessment.

I also brought in Dr. Shot from Catholic University, Dr. Shobini from Catholic University who were experts on the Monte Carlo calculation that we used for the gamma assessment of what the exposure was from handling the samples.

The reason that had to be done was that the survey meter was offscale that measured the actual dose from the sample. And also that there was no survey taken the moment that the survey was taken, and as the noble gases were diffusing out of the sample during the taking of the sample. And so, we were given the difficult assignment of not only figuring out from what was in the coolant and after it decayed, but we were asked to assess what was the probably exposure during the degasing operation which was a really difficult job.

And so, I wanted to get the best people available to work on this. So, I got Joe Sage. We had a number of telephone calls with Lovinger. We used Lovinger's basic equasion for this in order to come up with the best possible determination of the exposure of these people. We had to double up with our own model for beta dose assessment to skin which, hopefully, the industry will be

able to use now for surface skin contamination.

Q Did you get the results of the sample analysis for the sample on the 29th?

A Eventually, yes. They did come right away as you know.

Q Did you record them as untimely?

A I don't know what you mean? Would you rephrase the question?

Q You say they eventually came. Should they have come sooner to be of use?

A The samples were highly active. Therefore, a great deal of chemistry had to be done before they could be measured. It would have been nice to have them earlier. I'm not sure there was any way on God's green earth of getting them any earlier.

Q In the procedure that you helped and assisted in developing was it contemplated that an RWP would be obtained before the sample was taken?

A Yes.

Q Were you involved in the activity for decontaminating personnel that had become contaminated as the result of taking the sample or otherwise?

A Yes, somewhat.

Q What was your role?

A I was called by someone in the Health-Physics

group and asked about decontamination regime. And I can't remember when this was. But I can remember being called about one specific individual.

Q Was that Mr. [redacted]

A No. I prefer not to use names. I can refer you to documents and give you the references that we have on the documents. And you can look this up.

Q Just tell me what happened in the case of that individual?

A This was chemist A in our report of the incident. okay, to give you the specific references that you can look this up so it is answered, all right?

Chemist A was in the incident on the 29th and 30th of March had some surface contamination -- skin contamination which they had worked on and worked on and did not come off easily. There were two things that I recommended. A) that we have an experienced physician look at it and recommend any further action, if necessary. And b) that in the future we use a regime which I got years ago from Dr. Thomas Lincoln at Oak Ridge which is a pretty good regime for trying to get halogens off the surface of the skin.

And these are the two inputs that I gave specifically to Thomas Mulleavy to answer his questions concerning this.

Q Am I correct that the existing procedures for decontamination at TMI did not provide the regime that you

got from Oak Ridge?

A Yes, they didn't provide quite so extensive. It was an adequate regime for normal operation kind of thing but it was not so extensive a regime. I'm not convinced that it would have done a whole lot better. But I thought it would be a good idea if this was repeated in the future probably to use a little more sophisticated regime.

Q What was the regime that you recommended?

A Okay, the regime that I recommended was, step one was water irrigation.

Q To a layman does that mean taking a shower?

A No.

Q Or bathing?

A No, just simple water irrigation to begin with. Simply just water. The first thing you do is just throw cold water on it.

Step two -- and by the way, each step may not be repeated more than three times before you go to the next step.

Step two, mild soap and water.

Step three, surgical scrub with a soft bristle brush.

Step four, sodium carbonate scrub.

Step five, consult a physician before going further.

There are a number of specific things. A physician

and chemist in combination.

Q How did that regime differ from the regime that was already set forth in TMI procedures?

A I believe the sodium carbonate was not even in the TMI procedures. I believe that step four was not in it. The first three steps were in as a matter of fact.

Q Did the --

A There was also I gave them some regime for general fission products, too.

Q Was the sodium carbonate that was to be employed in solution or dry?

A Well, it would have been used in solution. But often it is stored dry and you mix it at the time so that you have a longer shelf life.

Q What did it do?

A Sodium carbonate? It would just help complex the iodine, that's all. Basic solution.

BY MR. BATTAST:

Q Did it do anything? Did it do any good?

A I'm not so sure that it did a whole lot of good after the scrubbing. The scrubbing seemed to do -- Well, there was a problem and that is that they used EDTA in the middle of the regime. And that really shouldn't have been used for the halogens. And that was the problem there.

You see, EDTA is a radiac wash type thing. And

it is around. And most Health-Physicists say if we can clean tools with it we can clean surfaces with it. But EDTA seems to fix the iodine on the skin a little. And it really shouldn't be used.

Q Did you become aware of any other instances of contamination of individuals beginning on March 28 other than the instance you have just discussed?

A Yes, there were several other individuals that showed some iodine and whole-body count. And on -- So, the next step that I recommended was that they shield the thyroid and recount the individual to try to determine whether or not the iodine was, you know, in the thyroid or whether it was on the skin.

And there were several other people that did have some skin contamination.

Q Did you have any role in the decontamination process other than the recommendation you made to do another whole-body count with the thyroid shielded?

A I am trying to think back on those early days. I can remember being, of course, more worried about having the iodine in the thyroid than anywhere else. I am trying to think.

We did perform a series of calculations on the dose to these people from the remaining iodine to try to determine whether it was necessary to consult a physician

to take further steps in the removal of the iodine from the skin. And this was after the fact, though.

I was not involved in the early -- in the first scrub process if that is what you are asking. I got involved later on after I saw the whole-body count results. And then the question was since it is not an internal body burden, what do we do about getting it off the skin? And we had some -- I had some discussions with Tom Mulleavy and possibly other members of the Health-Physics staff concerning this.

But this was, you know, this was after the fact. I did not have a direct role in the initial decon if that is what your question was.

Q What was the nature of the dose assessment that you made?

A Okay, the first thing we had to do was to work up a model. The NRC had suggested using the MIRD model which is a model that assumes that the iodine is distributed throughout the dermis. And this was reasonable for medical procedure where they have injected the iodine into the body, you know, or into the skin and it does get throughout the dermis.

We knew that this is most likely not the case and that the iodine was -- it was, you know, administered topically. It was not injected in.

And therefore, we wanted a model that would more closely resemble the actual conditions. And that's why I brought in Dr. Sage from Kentucky to work up a model that was closer to the actual conditions than the MIRD model that the Commission had used. And rightly so because that is what was available. I mean, that was already worked out. Even so it had been worked out for another use and another case.

And so, we -- the first thing we did was to come up with what we thought was a reasonable model for the distribution of the iodine and then came up with a series of calculations depending on the thickness of the epidermis. Because as you know, it is much thicker, the pads of the fingers and the palm than it is on the back of the hand, for instance.

And so, we had a model that we made for all skin thicknesses, all epidermal thicknesses existing in the body. And made it flexible enough to take care of all cases. And we -- after we came up with a model, then we performed a series of analyses of each case.

The difficulties involved there were that it is very difficult to use whole-body counter data to assess the actual number of microcuries per cc because the whole-body counter does not give you an exact definition of the area of contamination. It gives you a broad look at it. It doesn't

tell you that the area of contamination starts at, you know, at point one and stops at point two.

So that the best data we have were actually the beta pancake tube measurements which were more specific to the area -- to the size of the area and the exact location. And so, we used both -- we used all the information we could use in order to come up with the assessment. And we attempted to make the assessment as precise as possible.

Q What means were employed during the emergency to determine the existence of or the level of personal contamination? You mentioned whole-body counter. You mentioned some kind of pancake?

A Tube, yes. This is a GM tube, a Geiger-Muller tube which is almost two inches in diameter and three-quarters of an inch deep. It is specific for measuring beta activities. It is roughly two milligrams per centimeter, a window across it. It is in a probe that is shielded so that you have some shielding from natural background radiation. And it is well-designed. It is hooked up to a count rate meter. And it is well-designed for looking at surface contamination.

BY MR. LYNCH:

Q Is this the HP 210 probe?

A This is the Eberline HP 210 probe.

BY MR. DIENELT:

Q Were there other devices that you used for detecting personal contamination?

A Not that I am aware of. There are many of these probes throughout the plant. And as far as I know we used -- for surface contamination they used direct wipes for removable contamination. They used the HP 210 for removing and fixed. And we used the whole-body counter for looking at total body burdens. And then the thyroid shield to try to differentiate between the internals and externals.

And as far as I know we didn't use any other instrumentation for these determinations.

Q Do you know whether records were kept of the instances of contamination which were found?

A Yes. We were able to find records of these. Yes, the Health-Physics furnished us with data we asked for. We asked for data from the Health-Physics frisking. And these records were kept.

Q Do you know whether reports were made regarding the contamination and the decontamination?

A Well, I for one made a report. In other words, we have a very detailed file which we showed to the Commission which they are still looking at it sometime on all the data involved, all the whole-body counts, all the frisks, all the surface areas. And we have a very detailed record of that which Mike Solodium of the NRC

went through a fair amount of detail as a matter of fact. I believe also Greg Yuhas reviewed this from the I&E investigation team. And I believe there are a number of other people who have also been through these records.

Q To your knowledge were reports on individuals who had been contaminated written up?

A Yes, my group wrote up reports on somewhere between 12 and 15 individuals. I can get the exact numbers if you are interested. Well, wait a minute, that was as of about a month ago, a month and a half ago. And since a month and a half there are a series of other reports that we have written up on individuals that have had contamination or extraordinary -- or suspected high exposures.

Q At the time the contamination took place were you aware of a contamination of the radiation protection foreman who was involved in the March 29 sampling?

A Can you define at the time?

Q Within a day?

A I think it was probably two days before I knew that the -- strike the name. I wish to use Chemist A and Health-Physicist B. I was aware right away of the Chemist A contamination. I was probably not aware until 2 or 3 days later of Health-Physicist B contamination.

Q Did you have any role in the decontamination of

Health-Physicist B?

A Not that I can recall.

Q Were you aware of an instance of contamination in which an individual was contaminated in the area of the groin?

A Yes, we did an extensive workup of that individual.

Q Were you aware of that instance of contamination within a day of the time it occurred?

A I can't remember how soon it was. It was fairly shortly after that we were aware of that one. But it might have been two or three days. I'm not sure about the timing on it.

We did perform an extensive review of that individual's case. I don't think that it was within even two or three days. It seems to me that it was even more than that.

Q Were you involved in efforts to decontaminate that individual?

A No. That case was brought to my attention later on. And it was past the point where the skin contamination -- skin decontamination would have been effective.

Q In preparing the reports that you prepared in connection with the instances of contamination did you rely exclusively on the records of the Health-Physics Department?

A No.

Q What other sources did you employ in preparing

that report?

A Extensive questioning of the persons involved. Extensive. All people we saw a number of times until we were satisfied that the time emotion studies that we performed were as accurate as we could reasonably get them. We relied on whole-body counts. We relied on the people -- when people frisked themselves and find a significant amount of contamination they have a pretty good memory for that because it isn't usual that this happens. This is a pretty unusual situation. Normally one wash and everything is gone if you have anything to begin with. And when something remains after the wash it sticks in their minds pretty well because it is a very unusual situation.

And so, these people had a pretty good idea what levels were, also. And so, we matched up as many things as we could on this.

We also got from Greg Yuhas some testimony on some of the people that he had a few weeks earlier than we had because he uncovered some instances of contamination that my group wasn't aware of. And we wanted to get the best recollection that we could.

So, we worked as close as we could with the Commission in order to pool the body of knowledge and get it as up-to-date as we could.

You realize that people's stories change from time

to time. And so, you just have to put as much input as you can into the total effort of reconstruction of what happened in order to try to come up with the most accurate recreation of what happened as you can.

Q As an example, if you would take the case of the Radiation Protection foreman who was contaminated, can you describe for me what records you got from the Health-Physics Department with respect to that instance of contamination?

A He had noted down in his own personal diary, as I remember it, I am fairly sure this is correct, he had noted down in his own personal diary the numbers each day as he frisked himself. And he opened his diary up and gave me those numbers that he had noted down.

Q Did you receive any other documents or any other records from the Health-Physics Department with respect to that instance?

A I can't remember that. We have a file full of documents. I mean literally hundreds. And so I, you know, I can make a phone call to my TMI office and have somebody look up that if you are -- How much detail do you want on that?

Q We can follow that up later. I want to get your testimony today in the time that we have.

In the normal course when there isn't an emergency what is your understanding of the records or

reports that are required to be prepared and maintained in connection with the instance of contamination?

A There are Health-Physics procedures that spell out what the definition for significant contamination. And as I recall if after the first wash -- In other words, people come from a hot job -- strike the if after hot job. When people come in from a hot job they frisk themselves. If their hands or their face were contaminated they immediately go wash up, refrisk. Normally this is lose surface contamination and comes right off.

At that point if there is any contamination above the set level, and I am trying to remember what that is. It is something like 100, 200 disintegration per minute per 100 square centimeters, that is the ball park number. And normally, if there is anything significant above that point, and the number might be higher. There might be a thousand. But the thing is, and it is not a very large number.

Then a report is made. And the HP supervisor is notified. And it is up to him to make further notification as he sees fit.

Q As you understand it is that report kept in the HP files?

A I'm not sure where that report is kept.

Q You are not sure whether or you are not sure where?

A I am not sure where that report is kept.

Q But as you understand it it is kept somewhere?

A Yes. That's my understanding. That it is kept somewhere.

Q Was the procedure for the preparing and maintaing a report which exists during normal times, as you understand it, followed in instances of contamination during the emergency beginning on March 29?

A I don't believe that it was completely followed in all cases. We did get some documentation from Health-Physics on a number of people. I think that some of the information we got verbally rather than having it all written down.

Again, I'm going to have to -- You've got to remember that since then we have gone through so many more people that I have a hard time remembering all of the specific instances. You are talking about the first group now. And we are way beyond that in looking at suspected exposures.

Q You have testified that you gathered together a large number of documents in connection with the write-ups that you did on the individuals who were contaminated? Is that correct?

A That's correct. A great deal of it we got verbally from Health-Physics people. And we just asked them to

reverify. And they came and looked at the data and reverified that the data we had was, in fact, correct. And we were -- some of the data we were interested in. And the stuff we were interested in we asked for copies of. Other things we didn't ask for copies of. And so, I don't have all of the original HP data. But I have it verified.

Q Did you ask for copies of the reports if they were prepared which are required under the normal procedure to be prepared in instances of contamination?

A I asked for data. I did not specifically ask for a report per se. I asked for the -- I asked for all of the data which was available.

Q Including all the reports that were made?

A I asked for all available data period really. In other words, that would include everything they had.

Q Would it be your assumption that if a report on contamination was prepared and did exist you would have gotten it?

A Yes, we should have gotten it because we certainly asked for everything they had.

Q Would you have retained it?

A Yes, we retained -- we threw away nothing.

Q It would be in your file if, as you understand it, it, being the report, had been prepared?

A Yes.

Q Do you know whether there was a physician present or called at the time when the decontamination of the individuals was taking place?

A Wait just a minute.

(Discussion off the record.)

THE WITNESS: To the best of my knowledge the physician was called in a day or two after Chemist A had performed the initial decontamination.

BY MR. DIENELT:

Q Was this for purposes of completing the decontamination?

A This was for purposes of asking the physician whether any steps were necessary in order to take care of the health and welfare of the individual. This includes further decontamination. It includes any other medical procedures or non-medical procedures that he would recommend.

Q Are we going to have to call this physician L?

A No, because that is not his initial.

Q It is not Dr. Lindeman?

A No.

Q Who was it?

A Someone much more knowledgeable than Dr. Lindeman. Dr. James T. Brennan.

Q Was Dr. Lindeman called in at all?

A Well, Dr. Brennan is on the Board of Directors of RMC. And therefore he represented RMC in this. As I remember Dr. Lindeman was in Europe at the time of the accident.

Q Were any other physicians called in either in connection with this instance or any of the others?

A We had some of the local physicians in. And I am trying to remember why. It seems to me that it was not in this -- They were not called in in this instance. The local physicians were not people experienced in decontamination and in interpretation of Health-Physics results. And that's why Dr. Brennan was specifically called in because of his depth of knowledge in this area. He is much more knowledgeable than Dr. Lindeman in these areas in my opinion.

MR. DIENELT: We will take a short break.

(Whereupon, a recess was held.)

THE WITNESS: I would like to put one more thing on the record about the question concerning the contamination reports. I am going to have to look up the procedure to see whether it says that the information needs to be reported to the supervisor and the supervisor will make up the report or whether the report is made up by the HP foreman. I'm not quite sure who is tasked with making up that report. That detail just escapes me now. I think that

is not important.

BY MR. DIENELT:

Q Would you agree that during at least the first several days of the emergency the Health-Physics procedures regarding area and personnel exposure were reduced from what they are required to be in normal times?

A Off the record.

(Discussion off the record.)

THE WITNESS: The procedures were reduced?

BY MR. DIENELT:

Q Personnel exposure relaxed, reduced, could be more specific?

A I am still trying to get the thrust of your question. Relaxed in what way is what I am going to have to ask you?

Q Why don't you tell me what your assessment of the Health-Physics program you made at Mr. Herbein's request when he asked you to do a quality assessment was? Maybe we can get at it that way.

A My assessment was, of course, a long, many faceted one. My assessment was that we did not know the airborne halogen levels within the Auxiliary Building. And yet we had to send people in there. Therefore, it was necessary to take extraordinary measures to insure the people who were in the Auxiliary Building were whole-body counted. And we

took extraordinary procedures to see that the people were properly fitted with their Scott Air Paks and that the people had been respirator trained and had the proper physicals, physical exams by an M.D. prior to going in. And as a matter of fact, I remember in the very early days of the accident bringing in M.D.'s at 2:00 and 3:00 in the morning in order to perform a respiratory qualification check on workers before they were sent in just to be sure that we were being as careful as we could, that a) the people had the physical lung power in order to work in a respirator for the time that they were in there. And b) that they were properly trained.

And so, we did take some extraordinary precautions to overcome the lack of specific airborne concentration information that normally we would have required ourselves to have before we send someone in. There were very good reasons for not having that specific airborne activity information.

Q Let's just take that part of your assessment. When did you tell Mr. Herbein that because of the lack of knowledge of the level of the halogens these extraordinary procedures were necessary?

A Almost immediately upon my arrival. I mean, it was sometime the first day I was there. In other words, it was very soon in there that I reported to him that it was

very important.

Q What was the basis of your inclusion that the extraordinary procedures that were recommended were not already being followed?

A I'm not so sure that they weren't already being followed. I just wanted to, in my mind -- you asked me about, you know, what was I doing as far as the quality assurance check was concerned. And, therefore, I was going back and redoing some of the things the Health-Physics has already been doing. In other words, I found out that a number of these people had already been told by Health-Physics to go get a whole-body count. But I was just making sure from a, you know, from a QA point of view that, in fact, they were whole-body counted.

Q Did you make any inquiry as to what procedures were being required of people before they entered the Auxiliary Building?

A Yes, and I was told that they had to be respirator trained. And they had to have the physicals. You know, complete respirator training which required the physical.

Q Who told you this?

A One of the Health-Physics supervisors. Whoever I was talking to -- I talked to whoever was at the time down there making some decisions and was responsible for it.

Q Did they tell you that the procedures that you

just described were, in fact, being followed with respect to access to the Auxiliary Building?

A Well, as far as the -- as far as respirator training, yes. I did ask it. And I am told that -- and as a matter of fact, I believe that, you know, there were access lists that were prepared. And as I remember the Commission -- very early on the Commission was down checking the access list against the list of people that had physicals. Now, this was done very early by the Commission as I remember.

Q Did you ask the person whom you were discussing the procedures that were being followed for entry into the Auxiliary Building with what controls over entry into the Auxiliary Building were being exercised?

A It was my understanding that -- my understanding that only people authorized by the Unit Two Control Room were allowed into the Auxiliary Building. That was my understanding at the time.

Q Your belief was that the Unit Two Control Room was, in fact, controlling the access to the Auxiliary Building?

A Yes. Now, it might have been through Dubiel or Mulleavy. But the point is they were the acting HP supervisor at the time.

Q Your belief was that adequate radiation protection

measures were being required before a person entered into the Auxiliary Building?

A That was my belief with the understanding that under normal circumstances the adequate radiation protection is presurveyed, knowing all the gamma levels, knowing all the airborne levels. And in cases where it is necessary knowing all the beta levels.

Now, with the understanding that we knew that we didn't know all these levels and we knew that they were changing, with that understanding then it is my belief that they were taking, you know, precautions as best they could.

Q Would it be fair to say that the absence of knowledge about what the levels in the Auxiliary Building were should have resulted in tighter access and greater control over access?

A I'm not aware -- No, I don't think so. Because I am not aware of anybody that was in there that didn't have a darn good reason for being in there. All the people that I questioned, they were looking at liquid levels. Or they were closing or opening valves. They were doing things that were vital to the course of the accident and the investigation of the causes of the accident.

Q Did all the people that you questioned tell you that they had secured the permission of the Unit Two Control Room to enter the auxiliary building?

A No. I didn't ask the question.

Q Did you ever learn that people had entered the Auxiliary Building?

A No, as far as I know. Now, I'll have to go back. There are other people that have more intimate knowledge of these details that I know of. I can go back and research this from our files. It is possible that there are one or two people that we were talking to that were not there under the knowledge. But I am trying to think. Everybody that I know was doing something that they were told by the Unit Two Control Room that needed to be done.

Q What I want to know is whether at a time you were making the quality assessment for Mr. Herbein you had any knowledge that people had entered or could easily have entered the Auxiliary Building without securing the permission from the Unit Two Control Room?

A No, I have no knowledge of that.

Q If you had been aware that people had entered the Auxiliary Building without first obtaining the permission of the Unit Two Control Room what different advice, if any, would you have given to Mr. Herbein?

A More strict access to the Control Room.

Q How would you have suggested that that be effected?

A Probably the easiest way is that at the control point call up and check with the Control Room prior to each

entry which for the times I went in personally that was done each and every time. They did two things. First they accessed the computer to see if I had the proper respirator training and medical exams and they were up-to-date. And if they were applicable for the respirator I was wearing or the respirator protection I was wearing.

And secondly, after they did that then they had assigned RWP. And thirdly they checked with the Control Room. Very tight access. And that went pretty close to the accident. It wasn't that many days later.

Q Did there come a time when you were aware what the radiation levels were in the Auxiliary Building?

A The ambient gamma levels, yes. Now, I did not go all through the Auxiliary Building. I simply went d' ctly to the process monitors that I was interested in. Remember, you only have 18 to 20 minutes on a bottle. And so, your time is very limited.

So, I went directly up to change the charcoals that needed to be changed and went about my business and got out of there as soon as possible. It is a great deal of effort to change bottles which I did do. But I did not wander around looking at radiation levels. I had a survey meter on. I knew what radiation levels were where I was at all times. And I got right out of there. I was aware of the gamma levels only in the area where I was and only from other surveys that

had been taken by people that had been in for specific jobs. Nobody was allowed in just to wander around and see what the radiation levels were. People were only allowed in if they had a specific job to do. And then they brought back information about their radiation levels.

Q How do you know that?

A Well, this is, of course, as far as I know. But this is what I was told again and again.

Q Did you know, for example, that Health-Physics personnel were at the access control points for the Auxiliary Building?

A As far as I knew there was a Health-Physics, yes, there were Health-Physics people at the control points.

Q Do you know whether this was true on the 28th?

A From personal knowledge, no, I don't know that this was -- In other words, I didn't go down to the control point until a number of days later, actually to the access control point.

Q Can you recall a person telling you that from the time of the beginning of the incident or from any particular time that there were Health-Physics personnel controlling access to the Auxiliary Building at the access point?

A I can't remember that detail. I am sorry.

Q When you did enter the Auxiliary Building what were the radiation levels that you either found or were

aware of?

A I was aware of -- First, when I entered there were, you know, there had been some entries before. I had gone in and I had just looked at the levels where I was -- the levels of the elevations where I was going. I was going to 381 elevation which was upstairs from where you enter, up the flight of stairs and to the rear. And I knew that there were several massive banks of filters that I would pass that were in the hundreds of MR per hour. And I was also aware that there was significant halogens everywhere airborne. So, I had to be very careful with my mask that it fitted properly when I put it on. And Health-Physics said this, too. They were good about that. And I made surveys as I went out and came back. And as I remember, the radiation areas around the specific process monitors, the stack monitors that I was looking at, ventilation monitors, they were in the neighborhood of 20, 30, 40 MR per hour which is prohibitive for the use of those monitors.

Q When was it that you made your entry to determine these levels?

A Oh, about a week into the accident. Plus or minus a few days. It might have been two, three days earlier than a week. It was just -- It was early -- You know, it was fairly early on. And it was when the HP people that were gathering charcoals were beginning to mass enough exposures.

It was important that some other people begin to take some of this exposure. And since it was my group and me saying we have to have the charcoal everyday or every day and a half, then I thought, "Well, there is no reason why I shouldn't have some of the exposure, too." Plus the fact there were other things that I wanted to look for. It was hard to explain to them what to look for and how to react if they had problems.

BY MR. LYNCH:

Q You said 20 or 30 MR per hour, millirems?

A Yes, 20 or 30 milliroentgens per hour. Now, this was a -- I remember because it was down -- you remember you have sort of massive shields. And it was down inbetween these massive shields where I would have expected the levels to be very low.

Q You are talking about the instrumentation that was not suitable for that?

A Yes. You get 20 to 30 MR per hour around these sodium iodides.

Q You were using what instrument?

A What's that?

Q What instrument were you using when you went in?

A Oh, I was using maybe an RO-2. I'm trying to think what it was. It was an ion chamber survey instrument. I had one of the Eberline ion chamber survey instruments which I had

just checked out to make sure it was properly working before I walked in. And I remember putting it down inbetween -- You know, they have pretty massive shields around the, you know, three to four inches of lead. And I put it inbetween the two massives of lead. And down inbetween the two massives of lead where I expected the levels to be quite low it was still pretty darn high. And this was like a week into the accident.

Q You are talking about the high levels of the radiation monitors looking at the filters, not the levels that would be prohibitive for the instrument that you were using for personal monitoring or for the survey?

A Oh, no. No, the survey meter I had was fine for measuring the levels that I encountered as I walked through there. The problem was that the process monitors even with 4 inches of lead are still not designed to be much above 5 or 10 MR per hour. And it is significantly more than that outside. I went to a place inbetween two shields where it should have been very low. And I remember being surprised that down inbetween these two big massive pieces of lead it was 20 MR per hour where there was shielding from all but just one little direction. And I was kind of surprised that it was that high. And what that told me was that, hey, there is alot of activity in the air.

BY MR. DIENELT:

Q When you entered the Auxiliary Building and conducted your survey did you have an RWP?

A Yes.

Q That really would have been the -- Off the record.

(Discussion off the record.)

BY MR. DIENELT:

Q So far as you were aware is it your testimony that the control of access to the Auxiliary Building and the protective measures which were required of personnel who entered the Auxiliary Building were adequate?

A Do you want to add to that?

Q No.

A I am aware of one individual that was in there who was not a Health-Physicist but is well-trained Chemical Engineer who received an over-exposure that was due mainly to the fact that his survey meter was not working and he continued to walk through the Auxiliary Building. And he did not check his pocket dosimeters. Now, this is not surveillance in my opinion.

Q Are you aware of any other inadequacies in the procedures for controlling access or the procedures for assuring protection of the personnel within?

A Yes, I am. I am aware of a fairly recent inadequacy in performing beta surveys.

Q How recent?

A August.

Q Between the period March 28 and April 15 so far as you are concerned were there any inadequacies in either control of access or protective measures required of personnel in the Auxiliary Building?

A Not that I can recall at this point except for the one Chemical Engineer that I talked about that did not do what he was told to do before he entered. And from that one can draw the conclusion that he -- it could have been avoided if there had been a Health-Physicist with him. However, it is a very difficult decision to say, do you wish to give all those Health-Physicists exposure of having to wander out after people that a) know the area extremely well and b) have been trained to perform self-surveillance. And so, it is Monday morning quarterbacking to say he should have had a Health-Physicist with him. You expect a well-trained, well-educated professional to do precisely what he is told especially when he knows that there are unknown circumstances, there are unknown radiation areas that he is going into.

Now, with that exception I'm not aware of anybody that was not a) told that they had to continually perform surveillance. And b) that they had to do that right away if there was any problem with the respirators. And c) they

were told in general what the radiation levels were so far as was known at the time and told to stay away from certain areas if they possibly could.

Q When you reported to Mr. Herbein in response to his request that you do a quality assurance from the plant am I correct that you were satisfied that your inquiry regarding access into the Auxiliary Building and protective procedures for persons entering the Auxiliary Building had been sufficiently thorough?

A I did not perform a detailed survey of entrance into the Auxiliary Building point one. Point two, I am not sure I was ever really satisifed with my performance. I did the best I could with the hours I had.

Q Is that what you told Mr. Herbein?

A That's the essence. No, I said we are looking after the people that we feel are the highest risk persons. And I was not satisfied or should have had a closer -- there were a number of things that Monday morning quarter-backing could have been done better. And I should have looked at the exposures to the Chemists, Health-Physicists that took those coolant samples. We should have looked at that much sooner than we did.

There are a number of things that in retrospect I would do differently. But at the time I was -- we were trying to look at the highest risk areas and make sure that

we were taking care of those. And then sort of like a procedure where you look at the places where you can have the highest exposure and the biggest exposures and work down from there.

Q There was nothing at the time that you reported to Mr. Herbein that you felt that you needed to do to assure the protection of the maximum people that you were interested in; is that correct?

A I remember having talked with Herbein, with Limroth, with Lawyer about a number of things that were needed. There were just so many things that were needed early on in that accident. I can't remember specifically what we talked about. I just know that I had lists. And we would, you know, talk about it, okay, these were things we needed to do. This is equipment that we needed. And we had a number of meetings where we were just brought up-to-date.

Q At any of those meetings did you express any concern about the thoroughness of the inquiry that you made with respect to the Auxiliary Building, control of access to it, and protective procedures for people to go into it?

A Yes, I can remember expressing a concern for the fact that since there were single man entries there should be a second person waiting at the entrance to go pick up

somebody if he should faint from, you know, it is very hot in that building. And I can remember expressing concern for the safety of the single man entry. Not wanting to expand to double man entry exposures, but wanting to have a person there all suited up with respirator on. You know, that takes half, three-quarters of an hour. Less if you are in a hurry, I guess. But to do it properly it takes awhile to get completely suited up. To be completely checked out for the respirator, get all the gear on and ready to go. And what I requested was that -- I found out this when I went in myself. I went in, I went up there. And on my way out the bell started ringing telling me I was about out of air. And I was thinking to myself, there really ought to be somebody ready and waiting at the entrance to come get me if I don't come out in another minute in any case.

And so I can remember saying that, "Hey, we have to have a man suited up and ready." And a couple days later I went in. And that procedure had been implemented. And there was a guy on the RWP. There was a requirement who was my buddy that was going to be suited up and ready.

I can remember this one instance of things I can remember saying about what you are talking about. I was doing a broad brush. And I wasn't spending a whole lot of time with any one thing.

Q You were not aware of the lack of a buddy system, if I may call it that, prior to the time that you made the entry yourself?

A No, I wasn't. But the minute I went in I saw it right away and said something about it. It is an emergency procedure that you only learn from experience really. I can't think of -- I don't remember seeing this written in other plant procedures. Maybe it is there.

Q Were you aware of an incident in which a person did run out of oxygen in his mask or air in his mask?

A I vaguely recall that that happened to one person.

Q Do you recall whether you learned about it at approximately the time that it happened or sometime after?

A No, I'm sorry. I don't remember there being a significant intake from the man. I remember the man was whole-body counted and that the results of it were not -- in other words, that there was no significant -- the man did not have an investigation level of radionucleis internally as a result of it. That's all I remember about that incident.

Q Prior to the time when you recommended that the system be established which there was a person waiting to go in if the person who went in to the radioactive area did not come out within a certain period of time, am I correct that

it would have been possible as a result of fainting or industrial accident or something of that nature for an individual to have gone in alone, had that kind of accident and be killed as a result of radiation?

A I think it is pretty improbable. They did give you -- they did have a stopwatch there. And they knew when you were supposed to be out. And they paged you giving you some two to three minutes leaveway to get out before your buzzer went off. And after your buzzer goes off you still have three or four minutes of oxygen left. And so they -- there was a warning system that was set up about your oxygen supply. And so, if you didn't come out on time then we'd go in after you. But my concern was that there would be somebody suited up to go in after you and not somebody that has to throw on a respirator and go running in and then maybe contaminate the control point as a result of this entry. That's all. It was just a matter of a little bit better procedure.

It's not that they didn't have some procedure there. I think I might have mislead you on the earlier answer to the question. They had a timing procedure. And they did page you two or three minutes before the bell went off which was again two or three minutes. So, you had a paging procedure. Then you had a bell to tell you that you were about to run out of oxygen and that

you needed to come out.

Now, the worst in general, what would have happened is, of course, that obviously if you completely run out of oxygen you take the mask off. And you breathe in some halogens and then you go take some KI and flush it out of your thyroid. That is not a -- we are not into a life-saving kind of predicament which you were implying by your question at all.

Q Was the paging procedure and the timing procedure to your knowledge in existence on the 28th?

A I don't know.

Q The 29th?

A The paging and timing procedure was in existence when I first went in. And I don't know when it was instituted.

Q Do you know whether there was any potassium iodide available at the site?

A There was some brought in very early into the accident by two separate people that I know of within the first few days of the accident. I had -- I always carry it with me, by the way. Enough for 20 people I carry with me routinely. It is in my bag. And it always goes with me. However, there was not any on-site as far as I know the first day of the accident.

Q From what source did it come when it came?

A Dr. Brennan told me that he had procured some. And I believe that -- as I remember someone from Electric Boat brought some down, too.

As you know, the biggest problem with this has been the U.S. Government and the fact that they have dragged their feet and dragged their feet on giving us FDA approval for the prophylactic use. That's been the biggest problem. Because without this then the doctor puts his head in the noose when he prescribes it for a non-legal use. And we -- and everyone of the Health-Physicists that I am aware of have been after the government and after the government to cut through the red tape and do this. It should have been done years ago. It was done 15 years ago in England and in Canada.

And the NRC was fully aware of the use in Canada and in England. And why it was not done up to now, I don't know. I'd say this was to me a serious matter that the government did very poorly in.

Q What was the form of the potassium iodide that was brought in if you know?

A I can only speak first hand from my own, lougal solution.

BY MR. LYNCH:

Q Was it prescribed for you by a physician?

A Yes.

Q And you say you carried enough for 20 people?

A That's because that's the size it comes in.

Q Is this 20 people for a full regiment of 10 days?

A I don't understand the full regiment of 10 days.

Q It is standard dose for potassium iodide thyroid blockage as I understand about 100 milligrams of iodine a day for a period of 10 days?

A Okay. Well, that isn't my understanding of it. But this is 20 hundred milligram doses of the lougal solution. I believe it is by far the greatest flushing action is performed with the first intake.

BY MR. BATTAST:

Q It is not flushing but blocking?

A It is blocking action. It is both. If there's any in before it is blocking then it is flushing. If there isn't any in before -- If you take it prophylactically it is only blocking. If you take it the morning after so to speak then it is a flushing action that you are after. And there is a very significant flushing action up to six to eight hours after the intake.

BY MR. LYNCH:

Q That is 20 one-hundred doses of lougal solution?

A No, it is 20 one-hundred milligram of iodine doses which are around 130 milligrams of lougal solution. I forget what the ratio is. It is worked out in NCRP 55, I

believe, quite well.

BY MR. DIENELT:

Q Would you agree with me that if during the first few days of the accident there was no paging or timing system in effect for the Unit Two Control Room and if the --

A The Control Room or the control point?

Q The control points to the Auxiliary Building. And if one individual found a buddy accompanying him or standing by the control point entered the Auxiliary Building it would have been possible as a result of an industrial accident or fainting or some incident of that kind for a person to have gotten a serious over-exposure in the Auxiliary Building?

A Is the supposition here that no one knows that he is in the control -- within the controlled area, or excuse me, within the Aux. Building?

Q We will add to the hypothetical that there was no control of access to the Auxiliary Building as a result of which the individual would have had to obtain the permission or have advised someone in the Unit Two Control Room that he was about to enter the Auxiliary Building.

A My question is did anyone at the control point know that he was in there?

Q My answer is no.

A At the control point now?

Q That is correct.

A If the person was foolish enough to go down into some of the cubicles in the lower level of the Auxiliary Building it was well-known that there were areas there at the time of the accident that were considerably in excess of a few hundred R per hour. If one would wanter into those cubicles which, you know, is a little hard to believe that somebody would do, you know, somehow obtain a key and be able to get in, most of them are locked, if somebody could get in there then, you know, and then fall, slip and fall and knock himself out, then you would have had a very serious problem on your hands.

The thing that bothers me about your supposition is that you are supposing that a person just simply somehow gets protective clothing on his own, somehow gets a Scott Air Pak on his own without anyone from Health-Physics knowing that he's getting these, puts them on and goes in which is a, you know, is a little hard for me to believe that that could happen.

Q You will not agree that it was possible to have a serious over-exposure, I take it, if the person who entered the Auxiality Building had advised someone in the Unit Two Control Room even though there was no one at the access point that he was going to go in to engage in some

activity in the Auxiliary Building; is that correct?

A Well, we are going -- I am going to have to ask for some more hypothetical or some more information here. To advise someone in the control room, it depends upon the action that that someone takes, you know, to cover his entry as to what the situation is.

In other words, there should be Health-Physics knowledge of each and every person going into the Auxiliary Building on either Health-Physics knowledge or the knowledge of someone in control up in the control room that, you know, when the person enters and when he comes out. That knowledge is necessary.

Q Without that knowledge you would agree that it is possible for someone to have gotten a serious over-exposure as the result of some kind of industrial accident which kept him in the Auxiliary Building longer than they had anticipated?

A Improbable but possible.

Q Improbable for what reason?

A That I would suspect that the people going in there were people that had been in there many, many times before and were completely familiar with where the high-level areas were. In general the high-level areas were no surprise. We knew -- Most of the people that knew the Auxiliary Building knew -- you pretty well knew that the

filter banks were hot. You knew that certain sump areas were hot. And so, therefore, you know, the prudent person would just stay away from those areas and would do what he needed to do and come right back out again.

Q Did you know whether the requirements for RWP's were enforced between March 28 and March 30?

A I later learned of some situations where they weren't. At the time I did not know that they were not being enforced.

Q Is it your view that the circumstances warranted dispensing with the RWP requirements?

A In my opinion it would be reasonable to dispense the first few days of a serious accident with the RWP requirement if certain other surveillances were performed that would, in fact, see that the intent of the RWP requirement was being met.

Q Was there anything in the emergency plan that contemplates dispensing with the RWP requirements?

A Not to my knowledge.

Q What kind of surveys or alternative measures did you have in mind when you said that there were such measures that would warrant --

A It should be clear a) what the mission of the person is, b) that the mission be an important one that supervisory personnel have decided, you know, decided what

was necessary, c) that the person be knowledgeable and experienced in Health-Physics procedures and d) that the person know the area quite well so he knew precisely where he was, precisely where he was going, precisely what he was going to do and came right back out again.

Q As you understand it --

A And e) that if there were any extremely high-level areas that were unusual that the person be made aware of these unusual circumstances.

Q Do you know whether these 5 criteria were met with respect to activity that was conducted without an RWP between March 28 and March 30?

A No.

Q No, you don't know?

A I know of one activity where it did not happen. And that was with the taking of the primary coolant sample. That I am aware that that did not happen.

Q Were you aware of any other instances in which it did not happen?

A It's possible that there were some other instances. I'd have to look at the write-ups that we have for the -- we investigated some 20-some people that were -- that made entry in the first 4 or 5 days. And I'd have to look to see whether or not in retrospect that that didn't happen. I just can't remember all those details this far away

from the accident.

Q Were you aware of any instances between the 28th and 30th in which those 5 criteria were met?

A Oh, yes. Yes. Yes, there were some people that went into the lower level and got contaminated. They were in the lower level of the Aux. Building. And they got contaminated. And they were sent in for a specific purpose. They knew just where they were going. Management was aware of the fact that why they were told that they were performing an important job. They went in. They performed it. I think they were reading levels. I'm trying to remember what it was, and came right back out again.

And it was pretty, you know, it was closely controlled. They had survey meters with them. They used the survey meters properly. And the one person was sprayed with water from this valve as I remember and came right out as soon as he was sprayed.

But the point is that he did get a fair amount of water all over him, and some contamination which took awhile to get off. But in asking him, I remember asking him quite carefully about, you know, a) why he went in and b) how long was he in, et cetera. And these controls were met. This just happened to be one of the interviews I conducted personally and we went into this.

Q With respect to that incident how were the controls met?

A Well, first of all the job that he was going to do was quite important.

Q Who determined that?

A Okay, that was determined by the shift supervisor. The job was discussed. Apparently there had been some discussions about this job, secondly.

Q Do you know who in the Health-Physics capacity discussed this job with the shift supervisor, if anyone?

A No, but there was a Health-Physicist there. Again, it is just too many -- too much time since the investigation even. But the thing is that their -- they were made aware of the fact that this was going to happen. They were properly suited up with proper dosimetry.

Q How was that determined?

A His Health-Physicist checked him out just before he went in. The person went in, got sprayed with coolant accidentally and came out and washed off right away. And there was some residual contamination on his feet as I remember on this one particular person.

But in any case, you are asking me for an example. And just this one comes to mind because I remember just asking him about the conditions of entry and the conditions of exit and whether -- and who was aware of

his being in there, et cetera.

Q You were not aware of this incident at the time?

A No, I was not aware of the incident at the time.

Q Did you discuss with anyone other than the person you interviewed the area, what the basis for the decision to enter and what decisions with respect to precautions were taken were?

A Yes, I remember talking to the -- I wonder who the Health-Physicist was? I remember talking to somebody in Health-Physics about this case because it was one of the cases we were working up. And we went through the what you are talking about, just the general rationale. We didn't do it in this order but the thing is we did go through it.

And I also remember that it was a very important job that the person was doing. I think he was working with the level guage or something that was quite important at the time. They really needed to know the level. There was something wrong. They had to go down and take a look at it. So, it was something like that. And, you know, what he was doing was obviously important. And Health-Physics was aware that he was in there. And I checked him out and they were aware that he was properly dressed for the job. The coolant went through something like -- He had like three pairs of booties over galoshes. And the coolant went through all of this. And I remember being amazed that the

coolant was able to penetrate all these barriers. The guy had on plenty of protective barriers. So -- And so I didn't question the fact that, well, Health-Physics had done their job in telling him exactly how to suit out. And also there was a Health-Physicist that was there that helped him undress. I remember that, too, when he got back out again. So, there was coverage of the job from the control point of view which is I think what you are asking; isn't it?

Q How long would it have taken as you understand it to follow the requirements for making an RWP with respect to this incident?

A Well, you know, a couple of weeks into the accident they instituted the RWP requirements again. I don't remember being able to get an RWP through in less than about a day and a half.

Q Is that the normal length of time it takes to get an RWP?

A No, under these accident conditions because once we instituted it again everybody wanted to look at it. There were several layers of management. There was the ALARA Committee and there were several layers of the NRC that wanted to look at it. And the minute that was instituted again, boy, that really slowed things down. Which was good. In other words, we were at the point of the accident at that

point when we needed to really think carefully about all entries. We were no longer in that early, you know, crisis period of the accident. And it was better to overload the requirements, I think, at that point.

Q How long does it normally take or did it normally take to get an RWP at TMI?

A You are talking about a new RWP?

Q Yes.

A I would imagine it was an important job, a couple of hours maybe. Three hours. Something like that. Assuming that you were doing it on the first shift and the right people were around to sign off on it and to think about it.

Q Do you know or have an opinion as to how much longer it would have taken to obtain an RWP with respect to the incidents that you and I have just been discussing than it took to go through whatever was going through to assure the 5 criteria you have set forth earlier were met?

A Well, only to assure that they were met and that there was not a complete ALARA review, is that your question?

Q You outlined 5 criteria?

A Right. You asked me, you know, what were the criteria. And I came up with what I thought were generally 5 reasonable criteria for entry.

Q You gave me an example in which those 5 were met.

Now I am asking you if you know or if you have an opinion as to how much longer it would have taken to get an RWP than it took to make certain that those 5 criteria you outlined were met?

A Well, the only thing I can tell you is how long it did take to get the first couple of RWP's through when we, in fact, initiated the RWP's. And again, it was like a day and a half.

Q You have already told me that. You don't know how long it took to make sure that the 5 criteria you outlined were met or do you?

A I would say it would vary. But I would think, you know, not that long. As long as you can assign somebody to watch the person that was making sure that you had the right people there.

Q In the instance that you and I have been talking about where the person got sprayed, do you have an opinion or do you know how long it took to meet those 5 criteria?

A No. I cannot remember the details of that to give you the time on it.

Q In your view was there ever a life-threatening situation which would have justified a ban on donning any radiation protection procedures between March 28 and April 15?

A So far as I know there was not a life-threatening situation that existed. But there was potential for serious exposure of both plant personnel and possibly off-site personnel and that the information was needed to evaluate the seriousness of the accident And this was very important and justified expediting entries into the Auxiliary Building.

Q Were you aware of any modified or streamlined RWP procedure that existed?

A As far as I know -- It was streamlined to the point where it was verbal from the Control Room for entry via Dubiel, Mulleavy and the shift supervisor. You have to remember again this is secondhand information because for the first 2 or 3 days of the accident I was not down at the control point. I was just talking to people that had been there. And I was satisfied that we were not getting any serious internal uptake and that the exposures beyond the MPD's were quite few.

Q In connection with the measurement of iodine release --

A Release from where to where?

Q From the stat measurement at HPR 219 can you tell me what kind of gamma spectrometry was used?

A Yes, lithium drifted germanium detectors coupled to a high-speed ABC and a mini-computer in order to analyze

the spectrum. But more important than that since we were even off-site working in a varying background field the thing that we had were the best professionals available in order to supervise the counting and interpretation of the data. If you put a technician into a situation where he has varying backgrounds and other problems you are going to be in trouble.

And so, therefore, I had some very fine gamma spectroscopists that were -- that rode herd on the early days of the counting. And as a matter of fact, they were able to correct a number of NRC measurements that went astray.

Q Where did these people come from?

A I had for RMC Fraser Bronson came from Chicago in order to personally perform the gamma spectrum measurements. Charles Pelletier and James Kline came from Virginia to personally make these measurements. They were the first people in during the first week of the accident. And the NRC had some 5 professionals that came in to work in their van, also, I might add. After the first week of the accident the story expands greatly. I don't know how much detail you want.

Q Were you able to or were the people who were doing the analysis for you able to measure both I131 and I133?

A Yes. Both were looked at. These were the two of the things that we early on in the accident set up procedures for recording both -- recording the levels or the minimum detectable activities in the absence of the levels of activity. Does that make sense to you?

Q Did you report either the level detected or the minimum level detectable for both I131 and I133?

A In most instances. Now, there are some instances where if there was MDA it was not reported. But we went back and got after them on this. And I remember sitting down with Fraser Bronson and recalling many a spectrum and going back and just hand calculating the MDA which is easy enough to do.

Our biggest problems were background down in 81 KEV level from zeno 133.

Q Were the samples that you took from the HPR 219 purged for noble gas removal prior to counting?

A No, they were not. We were not aware of the chemical form of the iodine. Later on we found that there were a large amount of HOI species, large percentage. Thirty, forty percent sometimes. One has to be very careful about purging these intermediates. You can drive them off quite easily. And it is very difficult to prove where you stand on driving these intermediates off.

And so, therefore, it is a risky procedure. And

I did not want to institute that procedure in the middle of an emergency. I just didn't feel -- I am aware of the procedure. And since the procedure was not one that these people had routinely performed in the past that this was no time to start with a new procedure like that.

What we did was to set up geometries where we had charcoals that were as much as two and three meters away from the detector in order to cut down from the dead time from the 81 KEV line so that we could take a look at the 364 KEV line, the iodine line that we were really interested in.

In other words, there are ways around that without doing that. And there is a risk involved with that procedure is what I am saying. And I did not have a way to quantitate the risk at the time. And so, I thought the best -- I made the best decision I could at the time. And that was, don't start new procedures in the middle of an accident.

That is a controversial procedure. Some people like it and others don't.

Q By what means did you calculate, if you calculated them, the noble gas releases?

A Okay, first of all noble gas releases for the first four to five days of the accident were calculated by Pickard and Lowe, Pickard, Lowe and Garrig by

utilizing the normal Three Mile Island off-site environmental monitoring TLD's -- TLD data, subtracting background properly and normalizing the known meteorology. The meteorology was cross-checked with the ARMS -- there were two sets of meteorology. They were cross-checked with the ARMS meteorology which was set up at Holmes Air Force Base close by. And Pickard and Lowe used their own equasions for doing this. And then they used the more sophisticated EGG equasions for backing in using the meteorology in order to get to the source. And this method was cross-checked with several grab samples that we didn't know about when they performed some of the earlier analyses. But we got the results of some grab samples which correlate reasonably well with the predictions that we made. You know, within plus or minus one hundred percent which is good correlation.

Q Are you aware of any other means of calculating the noble gas releases which would have been more reliable and more accurate than the means that you just described?

A I am aware that there are other means. One could do a strictly theoretical. And by the way, the theoretical mix was reported in the monthly reports to the Commission. The theoretical mix was listed, as a matter of fact. And the theoretical mix was attained by taking the known amount of full-power hours on core, the known amount of decay and

then come up with a mix of radionuclei of noble gases that may have been present at the time.

There is a -- What can I say? There are probably other ways to do this. But this is the way that Pickard, Lowe and Garrig chose to come up with the mix of nuclei that caused the exposures to the TLD's. This was also crossed with the area monitors in the Aux. and Fuel Handling Buildings which told us when they were what we call burps or bursts of gas releases or periods of gas releases going tnrough the gaseous releases going through the Aux. and Fuel Handling Building. And then these again were the consequence with the exposure of the TLD's and the meteorology to give us the best possible mix that we could come up with theoretically.

Q I am not clear whether you regarded that method as more reliable or more accurate or as reliable and accurate?

A Well, what I am saying is we used -- we finally used a combination of the three to come up with the final numbers for the most probable releases of noble gases. And as far as I know that is the most accurate that we were able to with the information available.

Q Who took the grab sample that you discussed, if you know?

A The first grab sample was taken by Mr. James

Gellar, supervisor of Health-Physics and Chemistry from Salem Nuclear Generating Station. He was used because first he is by training a Chemist. And secondly, he is thoroughly familiar with the Health-Physics precautions needed because he had to go up to the top of the Unit Two stack to take them. And third, we needed a very tall person that could reach up and get the hose over the end of the stack. And so, he happened to be an ideal person to be able to go take that grab sample that we needed to take.

There were problems with taking it in the Auxiliary Building because of cross-contamination with all the halogens that are in there. A) which did not go to the filters and were not going out of the stack. So, it was hard. So, we did not have an appropriate way to take them in-house without getting a great deal of exposure.

Q Did you request this grab sample?

A Among other people I did, yes. In other words, there were a number of people. Dick -- I had talked briefly to Mulleavy and Dubiel about it, the fact that we needed it as soon as we could get it. And -- But I did not press to have it taken at any one hour or any one time. There were alot of other things that were happening at the time. And the grab sample had to wait its turn in priorities.

Q Were there other grab samples that were taken?

A Oh, yes. Yes. In other words, after the beginning

of April there were grab samples taken everyday. And then finally we got the new HPR 219 in service about the middle to the end of April which integrated and put us back on scale again as far as having an integrating process monitor.

Q What kind of exposure did the person from the Salem Plant who took the first grab sample have?

A I just can't remember that. He was not over-exposed. I do remember that.

In other words, there was no cause for alarm because of the fact that he had reached an over-exposure number.

Q What were the results of the sample if you recall?

A I can look it up if you want to wait a minute. I have it in the other room. Do you want to know the activity and curage per second kind of thing? Or are you looking for a gamma spec? What are you looking for?

MR. BATTAST: Both.

THE WITNESS: Well, the gamma spec I will have to call up about. I do have the curage per second on the graph in the other room.

BY MR. DIENELT:

Q Perhaps we can get them later and go on.

A That is available for you all to come down to my office at TMI. And we have the results of all these grab samples, the gamma specs, et cetera. You are certainly welcome to this information.

By the way, the NRC has -- I&E has this information from us already. They have, you know, all the information that we have they have copies of. As far as this particular area is concerned.

Q Did you have any involvement in any operational activities from the 28th to April 1st?

A Can you define what you mean by operational?

Q Let me ask you about the specific activities I am interested in. There was a venting of the makeup tank beginning on the 29th and then continuing on the 30th. Were you consulted about the venting of the makeup tank?

A I can remember getting a call on the hot line saying that they were going to have to vent and just making sure that there were teams on-site and off-site downwind so we could get proper measurements on the ground at the time. That's all I remember.

But I was not consulted whether or not the venting was necessary. That's not my area of expertise. I would not expect to be consulted. And had I been consulted I would have said I am not able to answer.

But I remember being told that they were going to have to vent and making sure that we had proper survey teams downwind to make measurements and that both gamma surveys were made and that they drew air samples through particular filters and charcoals in order to document the

site boundary and the off-site results of the venting.

Q Do you recall whether the phone call that you got about the venting occurred on the 29th or the 30th?

A No. I just cannot remember specific phone calls. Now, I do know that there were a number of them. It wasn't just one that we were told on a number of times that we were about to vent or going to vent.

Q So as you understand it they were engaged in intermittent rather than continuous venting when they called you up to make sure that the teams were in place?

A As I remember, yes, it was intermittent and not continuous. Now, I can't define what I mean by intermittent which is obviously your next question except that the hot line was just busy all the time. And we were always informed, you know, when the venting was over. And there was people watching the area monitors in the Aux. and Fuel-Handling Buildings. And that told us in itself, in fact, in many cases.

Q Do you recall learning of readings over the stack of 1200 MR per hour on the morning of March 29?

A Yes, I remember that a helicopter took a reading kind of looking down into the stack. And I can remember thinking, "Now how on God's green earth is anyone going to interpret that?" I can remember having that thought.

Q Do you recall a reading of 3,000 MR per hour on the

afternoon of the 29th?

A I remember a high reading. I don't recall the specific numbers.

Q Do you recall another reading of 1200 MR per hour on the morning of the 30th?

A I can go back and look these up. I have all this data in my office. I can remember that there were several high readings that were taken by helicopter that was flying right over the vent. And I can just simply remember thinking about, you know, what good that was going to do.

Q I take it that the high readings didn't disturb you because of the way in which they were made?

A Well, they didn't disturb me because I also had simultaneous readings from people that were at the fence boundary and people that were a mile out, two miles out, three miles out. And so that I knew what the people in general what were getting on the ground. They disturbed me because of the high number, yes. In othe words, the high number disturbs me. And then I asked, well, precisely where you were. And I found out, well, they were looking right down into the vent. And I remember thinking to myself, "Now who in God's -- Now who is going to take the time to calculate a vent that size, that distance, in what the dose is going to be coming from that large column of gas that you are looking at." I

can remember thinking that the reading was nowhere near as useful as a site boundary reading or a reading that was a little bit further away so that we could apply meteorology. I can't apply meteorology accurately looking down a column like that versus being away a little bit so you have some distance so you can start to use it intelligently.

So, I just remember thinking at the time that I hope that when these numbers get distributed that people understand the conditions upon which they were measured. And that's -- That was -- There was alot going on then. And my concern when I heard those readings was, "Is there someone downwind just off-site and maybe a little further just off-site in order to make sure that we know that we have some kind of feel for the populace exposure.

Q Was the monitoring at the perimeter continuous or only when a release was anticipated?

A There were for the first 3-1/2 to 4 weeks of the accident was 24 hours a day, 7 days a week. And there were at least 3 monitoring parties at all times with the fourth on standby next to a helicopter. The helicopter was not used all the time.

The monitoring was continuous for at least 3 monitoring teams. And the fourth monitoring team was used when there were going to be known venting events. And it was also used to attempt to map the plume which is a difficult

thing to do. We didn't do alot of that. There were some people from EG&G that were working on that.

And the helicopter was also used to ferry charcoal cartridges and particulate filters from distances remote from the plant back to the plant for counting on the jelly detectors.

Q Were you consulted with respect to any evacuation decision or evacuation plans that were made?

A I can remember discussing several times with the ECS coordinator, with the Health-Physicist and Nuclear Engineer the need for protective actions, one of which would be evacuation.

I can remember several times discussing this with the Bureau of Radiological Health in the State of Pennsylvania. And I can remember even having some brief discussions with people in the Watch Engineer's Office which was the NRC team.

Q Did you make any recommendations?

A My opinion was asked a number of times when we talked about it. And we did not see any levels -- because of the absence of halogens point one which was proved again and again, probably, you know, 50 times a day or something. We had a huge amount of backup information on the halogens. And because of the levels that we were getting from our survey teams and from independent peoples surveying, too.

We were also fed in alot of other information, that we did not even begin to reach a few percent of any protective action levels guides that were recommended by EPA and that EPA, the State, the utility and the NRC had all agreed were the proper protective action guides to use. These, of course, were all agreed upon long before the plant started up, the emergency plan.

Q Did you ever believe that an evacuation was warranted?

A No, I never believed an evacuation was warranted.

Q Did you make your view known to people at the Bureau of Radiological Health for the Commonwealth of Pennsylvania?

A I remember talking to Margaret Reilly several times about this. And she just asked, you know, is there anything unusual? Is there anything we should do? I can remember stopping for a minute, talking to the EOC and then coming back and saying the EOC coordinator, that is, and coming back and saying that nothing has changed and that we don't believe that -- See, you keep using the word evacuation. And I'm using the word protective action, one of which is evacuation.

Q Did you conclude that any protective actions were necessary?

A Okay, I am glad you used the word necessary.

It was my conclusion throughout the accident that the only protective actions necessary was to have the local Civil Defense organizations and the proper coordination all the way up through all the state emergency coordination centers on full alert and ready to take action should they be needed. And in my opinion, that was the only protective action that was necessary under the conditions that did exist.

I might add that I never heard any dissent from that from any of the NRC people that were there in the Watch Engineer's Office throughout the whole accident. That was also their independent view from what I could understand.

Q Did you have any role in establishing the Health-Physics training program at TMI?

A Let me think about that. I had a role in establishing the -- in helping to establish the training program in emergency response and a role in establishing training program and response to the radiation monitoring system alarms, high and low level alarms, and a role in -- This is all helping now, not doing the training. Although I did some of it, but just helping to establish the program in -- I guess the last thing I worked on was exposure to the fetus which is essentially radiobiology. I did not have a significant role in the overall training program. I had input in these areas.

Q You would not regard any role that you had in the design of the training or the actual training of the Health-Physics personnel themselves in their activities as Health-Physics personnel tc be significant? Is that correct?

A Well, I had a lot of little roles. But not a big overall significant role in this. I had, you know, a bit of an overview. And it was discussed with the supervisor RS&EE, Radiation Safety and Environmental Engineering in Reading, the management Health-Physicist. There was an overall role in just discussing certain things that he felt I needed to look at. But it was Dr. Jenckes' purview to be satisfied with this and also the supervisor of Health-Physics and Chemistry which would be Dick Dubiel. And they would be the two people who had the significant technical role. And my role was insignificant compared to theirs. I just looked at certain portions of it that I was asked to look at.

(At this time a recess was held.)

BY MR. DIENELT:

Q Did you ever assess the quality or the adequacy of the training program?

A Only in the areas that I was requested to assess it in. And I previously discussed those areas with you.

Q Did you form or have you formed an opinion of the adequacy of the training program as a whole?

A This is the training of the Health-Physics personnel?

Q Yes, sir.

A I don't think I have enough information about the training program as a whole in order to be able to answer the question. Not as it stands presently which is what you are interested in, as it stood at the beginning of the accident?

Q Yes, sir.

A I had it previous, you know, previous years. But nothing -- ...

Q With respect to the parts of the training program you looked at or assessed did you form an opinion as to their adequacy?

A Yes. The radiobiology was reasonably adequate. The radiation monitoring system set points procedures were more than adequate and properly detailed and justified. And the emergency training was far, far above average. It was stressed. And the pains were taken that each shift had an emergency drill. You know, there were essentially five shifts in an operating power plant. You know, three, first, second and third, and a training shift and a vacation shift. And all five shifts, so to speak, were covered in the emergency drill training. So that all the operations personnel were covered for the emergency plan training. And

this is not -- this is far above what is done normally. So that I would say that the emergency plan training was far above average.

Q Were there any other aspects of the training program that you had looked at?

A No, I reviewed the one-hour and three-hour lecture tours that are given and did make some comments on certain portions of those. But I felt that they were reasonable. I took the RWP exam myself. It was a fairly comprehensive examination which did show proper knowledge of the plant and the plant procedures in order to preserve the RWP on the badge.

But see, that is a small part of the overall training program. That is kind of an end result. That is what they had to demonstrate knowledge in. And so I looked at those things. And they looked adequate to me. You know, more than adequate. But I did not review in depth the overall planning or even superficially the overall training program.

Q In connection with the areas that you did review did you find any inadequacies?

A Not that were not corrected after they were found and discussed.

Q Give me one or two examples of ones that you found that were corrected?

A Oh, you know, there was some basis for set points that we decided there was a more logical way in order to base the set points for radiation monitoring systems or that the original basis should be changed in light of operating knowledge. In other words, a number of these were set theoretically. And after you have operating knowledge of a plant you go back and you re-look at them again.

In other words, what we found out there was operating history that gave us better basis for doing certain things. And so, we would go back and work on those. When you run a good emergency drill you always come up with fairly long set of areas that need work on them. Communications are always one of them. There are portions of communications that need work on them that -- and these are all on the record and have been reviewed by the Commission, the results of the drills and the followup on the deficiencies within the drills. These are all examples.

Q Did you ever review the training which was given on the SAM 2?

A Yes, the training that was given on the SAM 2 technician training for general use of the dual channel analyzer, the Eberline SAM 2.

Q Did you find that adequate?

A It was adequate until we had the experience, TMI,

where it turns out that we had such massive amounts of noble gases in the charcoals that we got some false positives. And at that point when you are into an accident and you find that you have a procedure that isn't working the better part of valor is to try to circumvent the procedure by having it done in another way rather than by retraining people. And that is precisely what we did when we saw that we were getting some false positives because of the exceeding -- the resolving capability of the SAM 2 instrument. We just simply said, "Okay, it is not adequate to use the SAM 2 in the field under these conditions with this much noble gases when we are looking for such miniscule amounts of iodine. We have the GeLi system set up. We will bring the charcoals back and count them on the jellys." That's what happened.

But you are correct in the fact that under actual conditions we found that the counting procedure for the SAM 2 are not adequate when you have massive noble gases in the environment and essentially no iodine. I would say that is a lesson learned.

Q You were never aware of complaints that were made by Health-Physics personnel that they did not have an opportunity for hands-on training on the SAM 2's?

A No, but I didn't go and ask them all about it either. I have no knowledge of those.

Q Did you have a role or an input into the emergency planning with respect to off-site radiation monitoring?

A Are you talking about the planning or during the accident?

Q The plan, establishment of a plan.

A Yes.

Q Are you familiar with the part of the plan that indicates that the environmental TLD's are supposed to be changed every four hours?

A No. I think that is an arbitrary number that was put in there. And you have to use your best -- you have to again use your best judgment on how that needs to be done at the time.

And as a matter of fact, we were called and asked about that at 8:00 o'clock in the morning on the 28th. And a great deal of thought went into that, into those decisions for changing and the TLD's as a matter of fact.

Q Do you know why the 4-hour number was chosen?

A I think the 4-hour number was chosen as an arbitrary number. So, you have to think of significantly increasing the amount of changes -- See the four hours would only be for massive doses of exposure where you would have something quite significant on them. The other thing that

has to be thought about is the in-transit dose. There are alot of other things that you have to think about. The four hours is the key to say, "Hey, should I shorten the normal timespan significantly and why?"

Q How does the radiological environmental monitoring program, the REMP, fit into the emergency plan with respect to the environmental monitoring, if it does?

A Oh, yes, most definitely. The stations that are established -- there was a reason for every REMP station. That was well-thought out ahead of time as far as to cover a population, to cover a prevalent downwind direction, to look at the fenceposts, et cetera. And so, from that point of view what the REMP attempted to do was to within a minimum amount of stations give us maximum amount of information about exposure to the environment. And there was -- No station was put out without a specific reason for putting it out, point one.

Point two, the REMP is the thing that tells you about the effect of the radiological effect of the accident on the environment. And it was set up so that, you know, if there was an accident that the frequencies could just be shortened and shortened and shortened to whatever time period was reasonable for being able to collect the samples.

The other thing that needs to be said here is that the REMP was designed on purpose to have all sample

collections performed by people that did not work for Met-Ed and during an accident would not be required to be on-site and to respond to the accident which is very important. Because otherwise, then there would have been the difficult decision, do we change or do we take samples or do we take care of the accident. And I wanted to be in the position of not having to have that as a consideration at all.

Q Are there provisions in the emergency plan that specifically refer to the REMP?

A Yes, there are some -- there are many procedures that are talked about that say that one has to give consideration to increased sampling. You know, for instance, iodine in milk.

Q Does it refer specifically to the radiological environmental monitoring program?

A I believe so, yes. There is an implementing procedure there that talks about the fact that these are all things that have to be thought about when you get to a general emergency.

Q Tech specs also make reference to the REMP to your knowledge?

A Does the tech spec make reference to the radiological environmental monitoring program?

Q Yes.

A Oh, yes. Yes, the normal program is spelled out in the tech specs.

Q Does the FSAR also make reference to the REMP to your knowledge?

A Yes, definitely.

BY MR. LYNCH:

Q Is the REMP, radiological environmental monitoring program, the same as the program that is specified in the tech specs?

A It is in excess of that.

Q What document specifies what the radiological environmental monitoring program is?

A Well, first of all what document on the docket specifies? The docket document --

Q Any document?

A Well, first of all let me answer -- first of all, there is a management audit program that is above and beyond the REMP program which takes somewhere between ten and in some cases thirty or forty percent samples in duplicate in order to assure quality assurance and has split samples counted at another laboratory which is completely independent from where they are normally counted.

Q That is not what I am talking about. I am talking about what document specifies what you term the REMP, the radiological environmental monitoring program?

A The annual report on the radiological environmental monitoring program to the Commission specifies what the program is.

Q Is that different from the one that is specified in the technical specifications or are they identical?

A I believe that more samples are taken than are required in the technical specifications. In other words, it is in excess of a technical specification program.

Q It is identified in the annual report done by whom?

A Teledyne-Isotopes Incorporated in Westwood, New Jersey.

Q So the Teledyne-Isotopes program is indeed the REMP?

A Yes. Not the emergency REMP, but the REMP.

Q What does the emergency REMP specify?

A The emergency REMP is specified by documents that we have forwarded to the Commission stating specifically from the first day of the accident on what samples will be taken and what frequency. And we essentially took alot of samples that we took monthly or quarterly we took daily We added many samples to this. And then we discussed with the Commission the lowering of these frequencies as we got out of the time when there was

significant iodine, 133, 131, 133 and then significant 131. And then the REMP now is being slowly moved back to something that approaches the original one except that there are many more TLD stations that have been established.

BY MR. DIENELT:

Q Would you regard yourself as the principal draftsman of the TMI emergency plan?

A I would regard myself as one of the principal draftsmen.

Q Who are the other principal draftsmen in your opinion?

A Dick Dubiel, Tom Jenckes and a number of the first line supervisors that helped to draft the implementing procedures for the Health-Physics area.

Q Would you also regard yourself as a principal draftsman of any changes that have been made in the emergency plan?

A I guess there have been alot of -- Yes, we kind of rewrote it, reput it together. The plan got so big and bulky it was unwieldy. About a year ago we began to rewrite it and to cut it down a little bit in order to -- When the document gets so big that you are spending an excess amount of time looking for items in it and wondering why things are in it, you know, at that point I helped streamline it. Because it just -- There were so many inputs and so many

addendum -- addenda to it that it began to get unwieldy to use. And at that point we went through and streamlined it, cut it down, cut out some of the portions with the State's permission, talked to them back and forth. But it was about a year, a year and a half ago that we cut it -- you know, streamlined it and cut it down. And it got to the point where it was just ridiculously large and hard to use.

Q You were one of the principal streamliners?

A Yes.

Q Were the other principal streamliners M. Dubiel and Dr. Jenckes?

A Yes.

Q Were there any others?

A Well, we had concurrence on the off-site sections of Margaret Reilly from the Pennsylvania Bureau of Radiological Health.

Q Any others?

A Any sections that -- Any sections that affected off-site and we changed -- we first dryran through her, got her input into it so that we would have, you know, proper coordination. I mean, it is ridiculous to take an emergency plan and just simply change it without letting the people that are affected know about it and have input into it.

Q Do you know whether there were any other consultants such as yourself who were involved in either drafting the emergency plan or streamlining it?

A I think we got a little information on the theoretical 2-hour LOCA -- you know, we needed theoretical information on the 2-hour LOCA, that is L-O-C-A, loss of coolant accident, source term within containment from the program that Pickard and Lowe has. And so we got some information on that. Again, it was theoretical information. And there was some discussions held with Pickard and Lowe about meteorology, use of meteorological data.

Dr. Jenckes could answer the question as to whether there were any other people -- any other consultants that worked on that. There might have been some othe specific -- very specific procedures that they had asked someone to look at, but I wouldn't have been aware of. But in general I don't think that there were that many.

Q Did you have a particular portion or particular portions of the emergency plan for which you were primarily responsible?

A Together with Dubiel and Jenckes we all worked at hacking it down and shortening it and making the procedures more terse and not so wordy and getting the huge preambles, moving them out of the plan so you didn't have

to wade through them in order to get to the heart of the plan. Just the natural growing plan. Most plans that I am familiar with go through these growing pains.

Q Did the three of you divide up the work in some way?

A Dr. Jenckes and I, I guess, did most of the hacking. And then we went back to Dick Dubiel who was very busy and got his approval on all of these changes. And none of them were made without, you know, the operational Health-Physicist saying, "Yes, I can live with this." Because it is ridiculous to change a plan and then not have him happy with it because he is the one responsible for getting it implemented.

Q Did you and Dr. Jenckes divide up the work, the hacking work in some way? For example, did one of you take the first half and the other the second half? Or did each of you take certain sections?

A We worked together on it very carefully. Now -- And drafts went back and forth. He was responsible -- Dr. Jenckes was responsible for assigning the work. And so, he had the major role in supervising this. The whole thing needed work. And so, I had to cut at it changing things. And he had to cut at it and Dubiel had a cut at it. It came back to me again. We went through this process several times. And so that it was an overall purview of

it. And it wasn't divided you take -- You know, you take procedure A, you take procedure B, you take procedure C. There were a few of them that was decided needed to be worked on and approved or added that were assigned. But in general, we round-robined it so that all three of us were completely familiar with the changes that were going on and agreed on it.

Q In what way, if any, did you take REG Guide 1.101 into account in the original drafting and the streamlining of the emergency plan?

A Oh, very significantly so. I think that, you know, that REG Guide was, how can I say, long overdue and much needed for guidance. And I welcomed it with enthusiasm. And we paid careful attention to all the major sections of the REG Guide. And specifically, we tried to make the emergency classifications meet what the REG Guide asked for. We tried to make sure that we had all of the sections that the Guide requested to be there. We tried pretty hard to meet the -- all of the intentions of the REG Guide.

Q Did you participate in the preparation of or the conduct of the emergency drills themselves?

A Yes.

Q Did you do so on a regular basis?

A Yes.

Q Did you have any role in selecting which shift

would participate in which drills or practice drills?

A No, I agreed with Jack Herbein that all shifts needed to be -- needed to have wet-hand training.

Q Insofar as you are aware all of them did every year?

A No. This wasn't always done. The first few times we held drills it was random picking probably two shifts that would have the training because the drills would usually run from one shift to another. So, there would be two shifts that would get the training. And the next year we would try to have two more.

But then the last time we held it we held seven or eight drills and all five shifts -- we were careful to make sure that all five shifts were trained. It's more random to begin with as far as the actual conduct of the drills. But you have got to remember that when you hold a first-shift drill which was normally what people hold you get the great majority of people involved because the off-shifts have very few people compared to the normal shift. And so, you train alot more people. You also run the risk of having a drill when you have many, many people around to do jobs that you will not have on the off-shifts. And that's why as we got into the training where we held more and more drills off-shift so that, you know, we would cover all the shifts.

Q Do you know if the personnel who were on the operating shift in the Control Room when the incident began at 4:00 a.m. on the 28th had, in fact, participated in an emergency drill in the past year?

A As far as I know most of the people -- I don't know the whole list of everybody on shift, but of the people that I recognized as -- I would say the majority of them did. I don't even know the whole list of people that you are talking about. But I would certainly say that the majority of them did, yes. There might have been some new people or some people that might have gotten missed because they were sick.

Q Did you keep the roll?

A Did I personally keep the roll?

Q Yes, sir.

A No, I did not personally keep the roll. However, the people that is documented who has what job for, you know, for the drills.

Q After the drills did you examine the roll or discuss the degree of participation of plant personnel in the drills with anyone?

A I discussed -- We critiqued every drill. And I'd say the last group of about seven or eight drills that we had I was personally there for six of them and participated in the critique. And for the ones that I wasn't there I

reviewed the findings to discuss, okay, how do we ajudicate these problems. But there were a couple since they were held around the clock, you know, it was only physically possible to be at so many and get sleep, too.

Q Subsequent to the drills did you make any effort to find out who had not participated in them?

A No, I made an effort to see that we covered all five operating shifts which was as much as we could do.

Q Do you know if anybody made an effort to find out what personnel had not participated in the drills?

A No. I have to ask Dick Zeckman that question. He is the person to ask that question. I think.

Q I want to show you a document that was introduced in earlier depositions as Exhibit 3018. It is not a very good copy. But I think we will be able to make out what it is.

A It is March 29-79, is that the date?

Q Yes, sir. That is a report submitted to Met-Ed by NUS.

A Is there something about drills in here?

Q No, it relates to the Health-Physics program in general. I'm moving on to another subject.

A Oh, this is not drills?

Q No, sir. In part it may be.

My question is whether you have ever seen that document before?

A No, I have not seen this document.

Q Have you discussed with anyone at Met-Ed the conclusions that NUS reached as the result of the study it did of the Health-Physics program?

A No, I was told that they were performing this audit. And I was told that they wanted to discuss it with me and that they would discuss it with me. And that is the last I remember of the whole thing.

Q I take it they did not discuss it with you?

A No, they did not.

Q Who told you they were preparing the report?

A I am trying to think. I think I heard it both from the plant and from Reading both that they were working on this. I was aware that NUS was working on this. And it seems to me that I was aware both from the plant and from the Reading people.

Q Do I understand correctly that between the time that you were told that someone from NUS would like to interview you and the time that I just handed you that report --

A Wait a minute. Wait a minute. That someone from NUS would like to interview me?

Q Isn't that what you said?

A No, I didn't say that at all.

Q All right, I must have misunderstood. What did you say?

A I thought you asked me was I aware of the fact that the report was being prepared. And my answer was yes. I was aware of the fact. You asked how was I aware. Answer, that I was aware because I was told by people at Reading and also people down at the plant that they were in the midst of working up an audit.

Q It was Met-Ed people who said they wanted to talk to you, not NUS people; is that correct?

A Yes, it was Met-Ed people that wanted to talk about some of the findings.

Q You have not talked to them about those findings?

A No, I have never seen this report.

Q Between the time that you were told that the report was being prepared and the time today that I just showed you the report you have had no discussion with anybody about it or about the conclusions that were reached in it?

A Not that I am aware of. I just remember being told that it was happening and it was something that they wanted to discuss with me. And that's all I can remember. It was completely independent.

MR. DIENELT: Would you mark that as Exhibit 3056.

(Whereupon, the Reporter marked a document entitled Evaluation of the Health-Physics/Chemistry Organization at Three Mile Island Nuclear Station Unit One and Two as Exhibit 3056.)

BY MR. DIENELT:

Q I have marked as Exhibit 3056 a document entitled Evaluation of the Health-Physics/Chemistry Organization at Three Mile Island Nuclear Station Unit One and Two performed by Mr. Thomas Potter and Mr. Donald Reppert. My question, Mr. Porter, is whether you have ever seen that document before?

A No. What is the date on this document? Is there a date on this document?

Q All I can say is that it preceded the NUS report and that it came subsequent to a request which is referred to in the report of June 29 of '77.

A I remember being told that there was a QA audit going on by Reppert. And I believe this is probably the QA audit; isn't it?

Q You don't recall having seen the report before today?

A No, some of the items in it were discussed with me. But they were not discussed in light of the fact that this was Reppert's QA audit report. In other words, I remember being asked -- Reading's Health-Physics people

asked me about some of these areas.

Q Do you recall --

A Especially the separation of the Health-Physics and Chemistry Tech jobs. We went over and over that a number of times.

Q What was your view with respect to that?

A That they should be separated.

Q Do you recall who it was in Reading that you discussed the --

A Thomas Jenckes.

Q Are you aware of any other reports, audits, QA assessments or the like which have been conducted by anyone relating to the Health-Physics program other than the two I have just shown you?

A I know there is an annual QA assessment. But I'm not at all aware of any except for the ones that you are discussing now.

Q Did you ever make an overall assessment with respect to the adequacy of the Health-Physics program?

A During the first year of operation I worked on a number of in-house procedures in the emergency response area having to do with a responsibility to two alarms on the radiation monitoring system, what I would call difficult, technical areas for a new plant to perform in. I worked on specific procedures that were difficult. It's very hard

for a new utility in the nuclear area to respond to. I performed a number of early reviews of the specific areas.

Q During the first several months in 1979 prior to the March 28 incident did you have an opinion as to the adequacy of the Health-Physics program at TMI?

A From the superficial view that I had during those 2 months, January and February, beginning of March, my opinion was that the -- That it was a fairly strong program and it had some of the normal growing pains that all plants did when going from one to two units and that in some areas they were a little understaffed. And we were using Rent-a-techs. But in general, you know, a strong program and an adequate program. That is an overall, superficial opinion that I have. I did not do an indepth audit of the program during these months. And so, I could just go by the report that I received from the areas that I was covering on emergency planning and from discussions with the Staff Health-Physicist. There were two Staff Health-Physicists at that time.

Q At any time during the calendar year 1978 would you have a less superficial view of the Health-Physics program than you did during the first several months of 1979?

A In the area of emergency planning I did. But I did not perform in 1978 an indepth audit of the program.

Q Did you regard the staffing of the Health-Physics

program as being adequate?

A With the Rent-a-techs that they had I believe the staffing was adequate.

Q Did you believe that the quality of the Rent-a-techs was adequate?

A As far as I know. I did specifically question two or three of the HP supervisors that were Rent-a-techs or foreman, I guess, is what they were. And I was fairly well impressed with the people that I specifically talked to about their knowledge of the instrumentation, of the procedures and what had to be done during the outages and during major maintenance because I did question a couple of people. But I was not -- That was -- How can I say? That was done -- I was there for another reason. But I just happened to do that because they were the people that responded.

Q Did you believe that the quality of the Health-Physics program diminished when TMI2 came on line?

A No, I don't believe that.

Q Did you believe that the quality of the TMI Health-Physics technicians was adequate?

A I knew that they had a number of new people that needed training. So, you have to define quality for me.

Q Ability to do the job?

A I did not specifically review the quality of all

the techs. And so, I can't answer you from a first-hand knowledge.

Q Did you believe that the quality of the performance was adequate?

A Yes.

Q Did you believe that the quality of the supervisors was adequate?

A Yes.

Q Did you believe that the Health-Physics program was adequately prepared to deal with the TMI emergency?

A It was adequately prepared from the short-sighted view that one necessarily has before you have this specific emergency. You always have a short-sighted view before a specific emergency because you don't really know how to deal with it. There are lessons learned, and important lessons learned. But I think that as far as the quality of the Health-Physics program for emergency planning, I think it was well above average. Now, in light of the accident there are a number of things that will be done differently. But I think the quality of the program from the base of knowledge that we had prior to the accident was quite good. It was good, not quite good.

Q Was it your view that the upper management of Met-Ed gave adequate support to the Health-Physics program?

A Yes. Some of the issues were hard fought. But

the thing that I think was that the support was adequate.

Q At least two of the Health-Physics personnel at TMI who were deposed took the view that Health-Physics was considered by the upper management of the plant either as one of them put it, as a necessary evil or as the other indicated, somewhat a victim of operations orientation.

A I missed a word.

Q Somewhat the victim of an operations orientation which the management of the plant had. Would you agree with either of those descriptions?

A No, I think they are overstated in my opinion.

Q Am I correct that in your view Health-Physics was given better treatment at TMI than the average?

A Yes.

Q In your view was it given sufficient treatment, sufficient place in the operations of the plant?

A Yes.

Q What do you base that view on?

A I base that view on the quality of the people that were in the supervisory and foreman jobs, in the general quality of the work that I reviewed such as gamma spectroscopy measurements there, such as the six-month effluent reports, the quality of the data, the response to the emergency drills which I helped each year, the response to some of the incidents that they had in the first few years of operation

which I thought was very good Health-Physics response to these incidents. I did not in the year and a quarter or so before the accident do an indepth review of the overall Health-Physics program. I only looked at sections. And so I can only be knowledgeable about the sections that I did, in fact, review.

Q Is there any other nuclear power plant whose Health-Physics program you are as familiar with as you are the Health-Physics program at TMI?

A Yes.

Q Are there more than one of them?

A Yes.

Q Approximately how many of them are there?

A There are five others that I am just about equally familiar with the Health-Physics program.

Q Of the six is TMI the best?

A Equal to or better, yes.

Q Than how many?

A Than all of them. In other words, the Health-Physics program there is on a par with the others or better.

Q Are the others all in the PJM area?

A No.

Q Can you tell me where the others are in general terms?

A In the greater northeast if we include -- How can

I say -- From let's say Virginia to Upper State New York. How is that? Middle Atlantic, Northeast. I am not familiar with in detail the Health-Physics programs outside of that area. And it is an important qualification to my statement.

Q Can you tell me how many of those other five facilities are GPU facilities?

A There are four of the others are GPU facilities.

Q Is the non-GPU facility --

A Wait a minute, excuse me. Wait a minute. Strike that. GPU facilities? Only two of them are GPU facilities. Two of the six are GPU facilities.

Q TMI and one other?

A Yes.

Q The other four are not GPU?

A Are not GPU.

Q How many of the six are PJM?

A Four of the six are PJM.

Q One last question on the Health-Physics program. If you were asked to rate TMI's Health-Physics program on a scale of 1 to 10 with 10 being the best where would you put it?

A I cannot answer that question without a great deal of thought. I don't feel that -- I don't feel that extemporaneously I can answer the question. It requires more thought than I have time to give it right now.

Q You would give it the same answer if you were asked to grade it A to F with A being the best?

A Yes.

Q Would you know whether the grade you would give it would be in the upper or lower five of ten?

A Definitely the upper five.

Q During the response to the incident what relationship, if any, did you have with NRC personnel?

A During what time period are we talking about?

Q Beginning from the time you got there until let's say April 10?

A Well, I lived in the Control Room for about a week and a half. And so, there was daily contact with NRC personnel discussing both the plant's monitoring of the on and off-site environment and also the REMP monitoring of the environment. We also had numerous discussions concerning personal protection policies with I&E personnel and many of whom I know, you know, have known over the years.

Q Was your perception of their role that they were essentially observers?

A No, they did more than observe. They observed and they were helping with the evaluation of the incident. They were involved -- In other words, they -- They did what I would have expected them to do. I never thought about the role. But now that I think about it they

observed and they also brought important conditions to the attention of management rapidly. And when needed they helped make measurements. They did many things above and beyond the call of duty in order to help with the accident. They were observers and -- But they did much more than passively observe. They actively observed. And they discussed the accident which also helped them in their evaluation of the accident.

Q Do you regard their role as a helpful one?

A Definitely.

Q Were they helpful to you personally?

A Yes.

Q In what way?

A They would bring to my attention conditions that were happening, you know, both good and bad. They would discuss problems of measurement and evaluation, discuss the overall situation. In other words, there was a 2-way verbalization of the situation which was important in evaluating the situation.

Q What relationship did you or your firm have during the response to the incident to analytical laboratories such as Teledyne and RMC?

A Is that the end of your question?

Q Yes, sir.

A We normally review the results from Teledyne and

RMC. And we normally see that the samples are collected and sent to both Teledyne and RMC. I personally did not have a direct relationship with the laboratories, but my people did here in the Ardmore office. One of the things that worked out fairly well was the fact that there was an off-site organization that essentially made sure that the samples were collected and on a timely manner were taken on a 24-hour basis, seven days a week basis to the laboratories. So that there was mix-up in collection and so that we had important things like in-transit doses were established and well-documented. For TLD's in-transit doses are very important. And then we -- the data would come in and we would evaluate it with the Metropolitan Edison headquarters. It was a co-evaluation of the data. And I got reports around the clock from my office on the first few days on the results of the environmental monitoring.

In other words, as soon as there is any information available about -- especially iodine in the environment and the TLD's, the noble gas exposures, I wanted that information as soon as available. And this data, I think the record will show, was available early on. And I made sure that this data was got both to Metropolitan Edison/GPU management and to the NRC. And Bob Borris was copied on all of our environmental monitoring documents. So, he got a

copy of everything that went back and forth. So, he was completely aware of what was happening as soon as we were.

Q Would it be fair to say that you or your organization essentially directed the analytical laboratories and their functioning?

A No.

Q Did they look to you rather than to Met-Ed for instruction for the samples and so forth?

(Discussion off the record.)

THE WITNESS: Would you re-read that, please?

BY MR. DIENELT:

Q Let me try to rephrase the question. Is it fair to say that you or your organization dealt with Teledyne, RMC and other analytical laboratories instead of or on behalf of Met-Ed?

A I think it was done -- Now, again, I would prefer if Dr. Gertz answered the question because I was at TMI. And he was here and he was involved. So, I say that I cannot really properly answer the question. I can end an answer for you. Is that satisfactory?

In other words, you are asking about things early on. And my understanding of it was that it was a joint thing where they were both doing it together. And they were checking each other to make absolutely sure that the data was being a) received in a timely manner and

b) properly interpreted. However, I think Dr. Gertz can answer that question much better than I can, much more accurately.

Q Perhaps we can work out some way to get his answer?

BY MR. BATTAST:

Q Basically we find that when we try to get the data from the plant oftentimes it came through let's say Teledyne's data on your stationery. So, therefore, we are questioning the manner in which Met-Ed gets the data. It appeared to us that it comes from Teledyne to you, you do whatever you do with it and then submit it. Is this a standard, routine method?

A No, that is not the standard, routine method. And Dr. Gertz is going to have to answer the question. But my understanding was that the data was being telephoned to Reading and that it was going out. And we were performing interpretations. But I am sure some got telephoned here, too. But I can't answer that really. I do not have -- I was there. I wasn't here. I don't have direct knowledge.

Q You don't contract with Teledyne and RMC or any other suppliers? Met-Ed does that directly?

A Absolutely. We do not contract with them at all. All we do is help design the program and interpret the data.

And those contracts are done strictly through Met-Ed.

Q How about the sample collectors?

A We control the sample collectors and are responsible for the accurate and timely collection of samples.

Q Do you collect the samples and then deliver them to the analytical laboratories and function strictly as a conduit to treat the samples and give you the information --

A That is correct.

BY MR. DIENELT:

Q I don't have anymore questions. I would like to ask you if there is anything that has not been covered in this deposition or in your I&E interview which you can think of which you believe would be of assistance to this special inquiry group in its inquiry?

A I want to state for the record that I would sincerely hope that you all would spend some time with the NRC use of the 1200 MR per hour helicopter numbers and how they were used in Bethesda and how the data and the interpretation of the data was related back to the State. This seemed to cause considerable anguish and confusion to the residents of Pennsylvania and to the assessment of the minute-by-minute situation. And I would hope that you would delve into this at great depth and really understand what happened and how the problems evolved or did evolve so

that everyone can learn from this.

MR. DIENELT: Thank you, very much.

(Whereupon, at 6:15 p.m., the deposition was concluded.)

CERTIFICATE

I, Roxanne Weaver, the officer before whome the deposition of SYDNEY W. PORTER, JR. was taken, do hereby certify that SYDNEY W. PORTER, JR., the witness whose testimony appears in the foregoing deposition, was duly sworn on October 5, 1979, and that the transcribed deposition of said witness is a true record of the testimony given by him; that the proceedings are here recorded fully and accurately; that I am neither attorney nor counsel for, nor related to any of the parties to the action in which this deposition was taken, and further that I am not a relative of any attorney or counsel employed by the parties hereto, or financially interested in this action.

Roxanne Weaver

Roxanne Weaver, Reporter-Notary Public

Notary Public in and for the
Commonwealth of Pennsylvania.

MONICK STENOGRAPHIC SERVICE

My Commission expires
July 18, 1983.

I have read the above and it is true and correct to the best of my knowledge and belief.

_____
Sydney W. Porter, Jr.

Sworn to and subscribed before me by said Sydney W. Porter, Jr., this _____ day of _____, 1979.

_____
Notary Public

My Commission expires _____