Deletions to be made on p 93

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DEPOSITIONOF RICHARD DUBIEL

Place - Middletown, Pennsylvania

Date - Friday, September 21, 1979 Pages 1 - 275

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the Matter of: :
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THREE MILE ISLAND :
SPECIAL INTERVIEWS :
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DEPOSITION OF RICHARD DUBIEL

Trailer #138
Three Mile Island
Middletown, Pennsylvania

Friday, September 21, 1979
2:30 p.m.

BEFORE:

For the Nuclear Regulatory Commission:

JOHN DIENELT, ESQ.
OLIVER D. T. LYNCH, JR.
HARRY NORTH
FRANK J. MIRAGLIA
DR. SHLOMOS YANIR

For Metropolitan Edison & Deponent:

MS. DELISSA A. RIDGEWAY, ESQ.
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

C O N T E N T S

E X H I B I T S

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PROCEEDINGS

Whereupon,

RICHARD DUBIEL

was called as a witness and, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. DIENELT:

Q Will you state your name and business address?

A My name is Richard Dubiel. Business address is the Three Mile Island nuclear station, Post Office Box 482, Middlewotn, Pennsylvania.

Q I am showing you a copy of Exhibit 3021. Have you had an opportunity to read that exhibit or a copy of it prior to today?

A Yes, I have.

Q Do you understand it?

A Yes, I do.

Q The testimony you give today is of the same force and effect as if you were testifying in a court of law. You will have an opportunity to review the transcript and make any changes in it that you deem necessary.

However, if you make changes of a substantial nature, it is possible that those changes could be viewed as affecting your credibility. So it is important for you to give as full and complete answers as you can. And for that reason,

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it's important for you to understand the question, so if you don't understand the question please let me know and I will rephrase it.

Also, I would like to ask you to let me finish the questions before you give an answer, even though you know what the question is. That will assist the court reporter in getting a clear transcript.

You have testified previously on several occasions before the -- strike that.

You have given interviews on several occasions to the I&E from NRC?

A That is correct.

Q I have marked as Exhibit 3039 through 3044, transcripts of the interviews which were held on April 24, April 25, April 12, May 8, and May 22, of 1979.

(Dubiel-3039-3044 identified.)

Do you recall being interviewed on that many separate occasions?

A I recall being interviewed several times, yes.

Q Have you had an opportunity since the time you were interviewed on those occasions to review either a tape or a transcript of the interviews?

A I do not have a copy of the transcripts. I have tapes. I have reviewed portions. I can't say that I have reviewed every tape made during interviews.

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Q Is there any portion of the interview which, on the basis of listening to the tapes that you have or on the basis of your recollection of the interview, you now believe was inaccurate or incomplete such that it should be clarified?

A I am not aware of any items that I think should be clarified.

Q Would it be fair to say that the answers you gave to the questions during those interviews were as full and accurate as you could make them at the time?

A I agree with that.

Q You have also been deposed by the President's Commission. Have you had an opportunity to review the transcript of that deposition?

A I am trying to get my depositions straight. Which particular day was that?

Q Do you recall being deposed on more than one day by the President's Commission?

A I had been deposed once. If you're referring to the deposition here at Three Mile Island, it was only once. Is that what you're referring to?

Q I have a transcript of the deposition taken on July 20, 1979.

A Yes, I recall.

Q Have you had an opportunity to review that

transcript?

A Yes, I have.

Q Were there any changes of a substantial or significant nature to it?

A No, sir. Changes were strictly of a spelling-error type change.

Q Have you been deposed by the President's Commission on another occasion than the July 20 deposition?

A I have not been deposed. I have testified in front of the Commission in Washington.

Q Do you recall the date of that?

A The last few days of May. I don't recall whether it was the 30th or the 31st.

Q Have you given any other testimony with respect to the Three Mile Island incident?

A I testified before the Hart committee. The date, I don't recall. It was approximately the beginning or middle of August. The particular interview with the Hart committee has not been concluded. We broke off after a couple of hours, and I understand they are going to get back.

Q Was that interview recorded or transcribed?

A That interview was recorded, I believe, on tape.

Q Can you recall any other testimony or interviews which you have given?

A No, I don't recall.

Q What is your current position?

A Supervisor of radiation protection and chemistry for Three Mile Island.

Q Was that your position on March 28?

A Yes, it was.

Q In general terms, can you tell me what your responsibilities in that position are?

A Today?

Q Yes, sir.

A My responsibilities are for the implementation of the health physics and chemistry program in Unit 1, as well as the definition of the program for Unit 2, but not directly for the implementation of the program in Unit 2.

Q How do the responsibilities you currently have differ, again in general terms, from those which you held on March 28?

A The major differences on March 28, prior to March 28 I had responsibility for not only the definition of the program but also the implementation of the program in both units.

Q Who has current responsibility for implementation of the program in Unit 2?

A The responsibility at the health physics level is Mr. David Limroth, who has [illegible]leavy working directly for

him. Dave reports to John Barton and through to ultimately to Bob Arnold.

Q Do you have a current resume?

A Yes, I have provided the resume to you.

Q I show you Exhibit 3045 and ask you to identify that.

A Yes, that is the resume I just handed you.

(Dubiel-3045 identified.)

Q Am I correct that on the fourth page of the exhibit the positions which you have held at TMI are reflected?

A That is correct.

Q When did you first come to TMI to work?

A I believe my employment date is September 9 of 1974.

Q Your prior health physics training was in the navy?

A I had health physics training in the navy. I also have a master's degree, nuclear engineering, which is actually the school which holds the health physics group at Georgia Tech. Any curriculum was strictly in the area of health physics.

Q Before you assumed your duties at TMI, did you receive any formal training in health physics from or through Met Ed?

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A No, I did not.

Q During the period beginning March 28, did you maintain a log or diary or notes of your activities.

A No, I did not.

Q Subsequent to the March 28th incident, did you prepare a memorandum or other document which stated what your activity had been?

A No, I have not.

Q Who is your present boss?

A Gary Miller.

Q To whom does he report?

A He reports to Jack Herbein.

Q Did Herbein then report to Arnold?

A Herbein reports to Bob Arnold; that is correct.

Q Do you have any -- strike whatever it was. Mr. Limroth is not your superior?

A That's correct.

Q Is Mr. Mulleavy now working for you?

A He does not work directly for me today, no.

Q On March 28, was Mr. Limroth your superior?

A Yes, he was.

Q Did you not, during that period, report directly to Mr. Miller?

A No, sir.

Q And during that time prior to March 28,

Mr. Mulleavy worked for you?

A That is correct.

Q You received a phone call in the early morning hours of March 28, notifying you to come to TMI?

A That is correct.

Q About what time was that?

A Approximately 5:00 o'clock.

Q And you then came to TMI?

A That's correct.

Q And you reported to the control room in Unit 2?

A That is correct.

Q And then you left the control room in Unit 2 to supervise or participate in the taking of a boron sample?

A Not immediately. I first left the control room to obtain a sample of the Unit 2 reactor building atmosphere, and then subsequently went to assist in the taking of a -- rather than assist, I think the proper word is "to supervise" the taking of a letdown sample for a boron analysis.

Q Who, if anyone, had directed you to take the atmosphere?

A George Kunder.

Q Had he also directed you to take the letdown sample?

A Rather than direct it, I think the proper sequence

was that he had a boron sample previously obtained after I had attempted to take the containment atmosphere sample. George indicated to me — George Kunder -- indicated to me that they had received a sample boron analysis that was questionable, and he asked me to determine if in fact we had an analytical problem, a sample problem, or if that was in fact the real number.

Q Did you take a sampling or reading of the reactor building atmosphere?

A We could not get a sample because the sample lines were flooded.

Q Am I correct that during or immediately after the time that you went to take the second boron sample, an alarm went off indicating high radiation levels?

A This was shortly after taking of the second sample. The sample had been drawn, analysis had been run, and about coincident with the value being reported to me, the radiation alarm came in. That was heard by those of us that were in the lab. We went to investigate.

Q Were you in the HP Unit 1 lab at that time?

A That's correct.

Q Approximately what time was it that the alarm rang?

A Approximately 6:40, 6:45.

Q You then proceeded back to the Unit 2 control

room?

A After getting the alarm and investigating and determining the cause of the alarm, I notified the control room of what was happening, indicated what I thought was the problem, and then proceeded to the control room.

Q Who did you talk to in the control room?

A George Kunder.

Q Am I correct that Mr. Miller had not arrived by this time?

A That's correct.

Q You told George Kunder that you suspected or believed that there was failed fuel?

A Yes, sir.

Q Did you discuss the possibility of failed fuel wtih anyone else?

A I don't recall I did. I know I talked to George Kunder. I remember speaking to him over the page phone. I don't recall whether I said it to anyone else.

Q Specifically, do you remember discussing it with Mr. Danowski?

A I don't recall.

Q What, as you understood it, was the significance of there being failed fuel?

A I don't think I put a significance on the failed fuel as much as I was interested in determining if we had a

release of activity from the plant. I didn't put -- I don't recall putting any significance relevant to the reactor state of the core at that time.

Q I take it that a site emergency was declared subsequent to your telling Mr. Kunder of the high levels?

A Almost immediately after I called him.

Q And am I correct that the declaration of a site emergency requires the implementation of the emergency plan?

A That's correct.

Q During the day of the 29th -- excuse me -- during the day of the 28th, you remained in the Unit 2 control room after you had returned in the early morning around 6:40 to 7:00 o'clock?

A That's correct.

Q And did you not leave until the sun came up the next day; is that correct?

A I did leave the control room once some time after the sun was down just to go over to the observation center to get a sandwich and then returned immediately. It was approximately a half hour, but I did not leave permanently until the morning of the 29th.

Q Then you returned sometime in the evening of the 29th?

A I returned shortly after noon on the 29th. I would estimate the time to be about 1:30 or 2:00 o'clock.

pv DAR

Q You remained in the Unit 2 control room for how long?

A I believe it to be until approximately 10:00 or 11:00 o'clock that night.

Q What did you do?

A Went home again.

Q For what period of time did your schedule consist essentially of coming to work and remaining in the Unit 2 control room, going home, and then coming back to the Unit 2 control room?

A Are you referring to how many days?

Q Yes, sir.

Q I don't recall the specific number of days, but I would imagine at least two weeks.

Q For that two-week period, except for such things as going to get a sandwich or going home, you were in the control room?

A That's correct.

Q Was the role that you played in fact during that two-week period different from the role which you were supposed to play under the emergency plan?

A For the two-week period, I would say that the role began on March 28, as defined in the plan. It lasted, I would imagine, well through that day and into the night. As time went on and within a day or so after the initial event,

I would say that the role was somewhat different in that some of the responsibilities were being given to other people to take the load and spread it around. I think we, in most cases, got away from the specific responsibilities.

I think the plan is really designed for the first six, eight, 10, 12 hours, whatever is necessary. But then I think it is a matter of evolving to what was necessary to support the events of the day.

Q I want to show you an organization chart which appears i a document entitled "Investigation into the March 28, 1979 Three Mile Island Accident," by office of inspection and enforcement of the U.S. Nuclear Regulatory Commission. It appears at page II-2-9, and is figure II-2-2.

The title at the top is "Normal Emergency Organization." Can you look at that chart, particularly with reference to the ECC and the ECS portion and tell me if, as you understood the emergency plan, that reflected the organization which was to come into place when an emergency was declared?

A That's correct.

Q Am I correct that the emergency director was to be Mr. Miller?

A Excuse me. You said "was to be Mr. Miller"? The emergency director is Gary Miller if he is on site. There

are other designated individuals in his absence.

Q And he came on site sometime after 7:00 o'clock on the 28th?

A That's correct.

Q And he acted as emergency director?

A That's correct.

Q Who relieved him, if anyone did, when he was sleeping or off site?

A I can't be specific as to times, but the various times we had Joe Logan, Jim Seelinger, George Kunder. In subsequent days, I recall Bill Pott. I also believe Mike Ross and Jim Floyd were as -- were on subsequent days, not on the 28th or 29th, but we got into a rotation where all of those individuals at one time or another had emergency director responsibilities.

Q And as I understand it, are there provisions in the emergency plan itself which set forth the chain of delegation when Mr. Miller is not available?

A That's correct.

Q And the chain, as you understand it, was followed in connection with the assumption by these other individuals of the responsibilities of the emergency director during the incident?

A Yes. We were in our emergency plan. We define several categories of individuals being station manager,

station -- or unit superintendent, superintendent technical officer, operation and shift supervisors, all of whom are trained in the role of an emergency director. Most of the -- in the days subsequent to the accident, it was more of an attempt to get on to a shift rotation so that individuals could have some time off, that prompted us to go to all of the individuals I believe I previously mentioned becoming emergency directors at one time or another.

Q Directing your attention to the box on the chart entitled "Radiological Assessment," am I correct that that is the job that you were to hold and did hold?

A That's correct.

Q Directing your attention to the box labeled "ECS Director," am I correct that that is the job that Mr. Mulleavy was to hold under the plan and did in fact hold?

A That's correct.

Q What were the responsibilities, as you understood them, under the plan which you were to hold as being in charge of radiological assessment?

A Responsibilities were primarily to evaluate plant conditions relevant to releases of radiological -- radioactive material, to evaluate those releases relevant to an off-site impact, to maintain communications with the off-site agencies, specifically with the state bureau of

radiological protection and to advise the emergency director in those particular areas.

Q Am I correct that under the emergency plan, Mr. Mulleavy, as ECS director, was responsible for the activities of the emergency repair parties and a variety of on-site and off-site monitoring activities?

A That's correct.

Q Am I also correct that both you and Mr. Mulleavy under the plan were responsible to report directly to the emergency director?

A That's correct. However, a normal operation of the emergency plan in previous drills, and also on March 28, the communications from Tom Mulleavy were to me rather than to the emergency director. And then I further communicated with Gary Miller.

Q This was the way that it had been done in drills?

A Yes.

Q Directing your attention to another organization chart, which appears on page II-2-12, figure II-2-3, of the report we have been discussing, can you tell me if this chart is a more accurate description or depiction of the organization as it functioned than is the chart that we have previously been discussing?

A That appears to have additional detail, and I think, in that manner, is in fact a more accura[illegible]

pv DAR

representation.

Q Directing your attention to the ECC radiological assessment and the ECS, ECS director boxes --

A Yes.

Q -- Do I correctly interpret the chart to show that Mr. Mulleavy was to report to you rather than directly to Mr. Miller?

A I guess I have a problem with the word "report to." Mr. Mulleavy communicated to me. He fulfilled his responsibilities as the ECS without any direct contact with the emergency director, but that contact or communications was through me, and I would say that it is a relatively academic point as to whether the line is drawn as appears in figure II-2-3 or in the previous page, which, I believe, is II-2-2.

Q Who was the emergency repair party leader?

A I don't recall.

Q In your drills, did the emergency repair party leader report directly to the emergency director or to the ECS director?

A In the drills he reported to the ECS director.

Q In the organization which was in place in responding to the incident, is it your understanding that the emergency repair party leader reported to the ECS director?

pv DAR

A There was an emergency repair party team mustered at the emergency control station, ECS, which did report directly to the ECS director.

Q As I read the chart which appears at figure II-2-3, the emergency repair party leader is reporting directly to the emergency director. Is it your testimony that that is not the way it worked?

A To clarify that, there is also an emergency repair party leader defined at the ECS reporting to the ECS director in II-2-3. This additional block over here, which shows an emergency repair party leader at the -- in the control room, or the ECC, was more a matter of circumstance than of design, in that when the emergency was declared, the superintendent of maintenance was in the control room and rather than take such an individual with his abilities and knowledge of the plant and have him leave, it was a common-sense thing to have a maintenance group available in the control room.

During the morning hours, that maintenance group provided technical input, plant knowledge input, to the emergency director.

Q Do you recall who the emergency leader that you were referring to was?

A In the control room, that was Dan Shovlin. I also recall Dick Seiglitiz, who's supervisor of maintenance, Unit

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pv JAR

2, being in the control room and again doing such things as researching drawings and prints to provide information to the emergency director.

Q So, as I understood it, the actual repair party teams remained under the supervision or direction of the ECS director?

A There was an emergency repair party team at the ECS under the direction of the ECS director, as best I recall.

Q To your knowledge, were any emergency repair party teams dispatched from or directed by the emergency repair party leader who was in the Unit 2 control room?

A I do not recall any emergency repair activities during the period as ascribed here, which is 7:30 to 9:00 o'clock in the morning of March 28.

Q Returning to figure II-2-2, which is entitled "Normal Emergency Organization," do you understand correctly that this or a chart very similar to this is the one which appears in the actual emergency plan?

A That's correct.

Q Do you know whether there was any amendment or change suggested to the plan itself to reflect the fact that in practice drills as well as in the actual emergency which you encountered, the ECS director organizationally reported to you and only indirectly to the emergency director?

pv DAR

A No, sir, there was not a change. To maybe clarify the plan, the organization that is defined in the plan is defined as if we had a minimum number of people on site. It's designed for the minimum number manning, so to speak, such that in the case, if an emergency were to occur on the back shift or on a weekend when normal daylight crew such as myself were not on site, it would still be able to function. In so doing, the radiological assessment function would come under the responsibility of the shift supervisor or shift foreman.

In that particular case, the ECS director would not be reporting through such an individual, but rather right to the emergency director. We, I believe, the modification that occurred on March 28 and also in some previous drills that involved all individuals such as myself and Tom Mulleavy, found that the -- of necessity, the communications was a lot cleaner, a lot quicker, if the communications was -- if the communications were between Tom and myself.

Q During normal times that was the way it worked: he reported to you?

A That's correct.

Q Mr. Mulleavy reported to you?

A That's correct. That's correct.

Q Were there some drills in which the organizational

structure as reflected in II-2-2, insofar as the reporting responsibilities of you and Mr. Mulleavy were concerned, was followed?

A Yes, sir.

Q And there were some in which it was not followed?

A Some in which the communications were modified, as I previously described.

Q Was it made known in advance of the drill which communications pattern among you, Mr. Mulleavy, and Mr. Miller would be followed?

A No, sir.

Q How was it determined during the drill which pattern you would follow?

A It was determined primarily by the emergency director, who, as part of his immediate responsibilities in the control room, is to establish the flow of communications.

Q And then the response to the March 28th accident, is it your understanding that Mr. Miller established the communications network which had Mr. Mulleavy reporting to you and you reporting to Mr. Miller?

A That is correct. But, again, I chose to use the term "communicating" directly with me, rather than reporting to me.

Q All right. Was the emergency director given

authority under the organization plan to make other changes in communications in order to maximize technical support personnel?

A Yes, sir.

Q What method was there, if any, for the communication from the emergency director to various personnel to let them know of the changes that he wished to make in the prescribed organization?

A As part of the emergency director training and also as indicated in the plan -- or, in the procedures, rather than the plan -- the emergency director upon arrival in the control room was to establish himself first of all as being in charge and, second, is to establish which individuals are responsible for which aspects of the emergency response and to define those communications networks.

Specifically, on March 28, Gary Miller did just that. When he arrived in the control room and was briefed on the circumstances, he immediately called everyone to attention and declared himself as emergency director and declared myself, Mike Ross, Dick Seiglitiz, and George Kunder, I believe, as being the individuals responsible for specific items, and that all communications in those particular areas would come through us and that only wanted a certain number of individuals talking to him, and that all communications

pv DAR

would flow through those individuals.

And I may be mistaken about the other names. I know I was one, but I don't recall the specific other individuals. I think I have them right.

Q You had the responsibility under the requirements that Mr. Miller set forth for radiological assessment?

A That is correct.

Q What was Mr. Kunder's prescribed responsibility?

A I don't recall.

Q Would that also be your answer with respect to Mr. Seiglitiz and Mr. Ross' responsibilities?

A I can only recall slight aspects of the total organization there, but I do recall that Mr. Seiglitiz was put back on the panel and was directly responsible for all operations of the plant.

Mike Ross, I believe, was -- I'm not -- I can't recall specifically.

Q Does looking at either the chart on page II-2-12, which is figure II-2-3, or the chart on page II-2-13, which is figure II-2-4, assist you in describing what the specific responsibilities of Messrs. Kunder, Ross, and Seiglitiz?

A Yes. As a matter of fact, I had just looked at that, and, if I recall, Mr. Seiglitiz was given total charge of the panel, which really would be the direct operations of the -- or direct control of the plant from the control room;

whereas Mike Ross was given total plant operations responsibility, including directing Mr. Seiglitiz and the panel and interface with him relevant to the secondary plant and auxiliary area systems.

Mr. Kunder, I believe, was put in charge of the technical support or trying to determine, based on plant parameters through use of the engineers, what specifically was happening in the plant.

Q So, using the chart at II-2-3, as you understood it, Mr. Ross and Mr. Seiglitiz were within the box labeled "Plant Operations"?

A That is correct.

Q And they were told that they would report directly to Mr. Miller and others would report to them?

A I think, to clarify, I think Mr. Seiglitiz was to report to Mr. Ross; Mr. Ross directly to Mr. Miller.

Q And you were in the radiological assessment box on the chart?

A That is correct.

Q Mr. Kunder was in the technical support box on the chart?

A That is correct.

Q And as you understand it, you, Mr. Kunder, and Mr. Ross were to report directly to Mr. Miller?

A Yes. There was at least one other individual that

was involved: Jim Seelinger, who I don't recall his specific functions, but he was also speaking directly with Mr. Miller. I would tend to put him in the same category as Mr. Kunder: technical support.

Q In prior drills, had Mr. Miller or whoever was acting as the emergency director made an announcement similar to the one you have just testified about, that he wants one person in charge of one thing and other people in charge of other things and he wants only certain people to report to him?

A Yes.

Q That was the standard operating procedure?

A It was something that we had determined through the previous years of drills to be an effective method of establishing the emergency organization in the control room, and it's something that we had stressed in our training programs for emergency directions and in fact had occurred for at least the last several drills, seven or eight drills, to my knowledge, those that I was involved in.

Q Would it be fair to say that in the actual conduct of emergency response or emergency drills, the organizational chart, such as it appeared in the emergency plan, was used as a guideline, but in fact the emergency director modified the original or established the organization in a way to try to tailor it to the specific

response?

A I would think that that would be a fair assessment.

Q Do you know whether the emergency plan or procedures had a provision which stated that the emergency director could make the kinds of changes to suit the particular situation such as I just described?

A I don't know that there is a specific statement in the plan or procedure that says that. I would think that it would be at least to a degree addressed.

Q Mr. Miller made the announcement in the control room?

A That is correct.

Q And that's where the announcement of the actual organizational structure would normally be made?

A That is correct.

Q How were people who were not in the control room advised of what their communications responsibility was?

A The direct communication with the ECS was between myself and -- well, Tom Mulleavy, but understanding that Tom was not at the ECS at the time of the site emergency declaration. At that time it was first a technician, Mike Janouski, and then Joe DeMann, and I called the ECS on the phone, on the page phone, and established that communications and established the fact that I would be

pv DAR

talking directly with them and that they were to come through me.

I don't think that it was of any unusual or surprise to them, in that I think they would anticipate if I were in the control room I would be the guy they would be talking to. I don't believe that there are any other links other than, of course, the Unit 1 control room, to Unit 2 control room interface, which is defined in the plan as is established via the control room hotline to -- which was the mechanism used, I believe, to bring the Unit 1 control room up to speed on what was happening and who was involved.

Q Mr. Mulleavy did come at some point to the ECS?

A Yes. He was there relatively early, but not at the time of the emergency declaration.

Q When he arrived, did he make contact with you?

A As a matter of fact, I don't recall the specifics, but I think it was just a matter of each time I spoke to Joe DeMann, all of a sudden it wasn't Joe, it was Tom. And I recognized that Tom was there and he was in charge, and I don't think I even asked whether he had taken over; I just assumed. I can't recall specifically.

Q Did you also assume that he understood that this communication line was to you, or did you specifically tell him to communicate to you?

A I don't recall specifically, to, but I don't think

there was a request. So, whether it was directly communicated or just a matter of circumstance, it happened that way.

Q Now, there came a time when the emergency control station had to be moved?

A That is correct.

Q And the reason for that was the contamination or exposure levels in the ECS?

A The airborne activity levels in the ECS, yes.

Q This was fairly soon after the emergency was declared?

A It was of approximately -- I recall about 9:00 to 9:30, maybe as late as 10:00, somewhere in that vicinity.

Q Prior to that time, as you understood it, Mr. Mulleavy -- or Mr. DeMann, prior to Mr. Mulleavy's arrival, was communicating with or dispatching various monitoring teams and repair party teams?

A They were not dispatching repair party teams, to my knowledge. I don't know of any repairs that were necessary. But monitoring teams were being dispatched, yes.

Q The ECS was moved to the Unit 2 control room?

A That is correct. Initially, yes.

Q How long did it remain in the Unit 2 control room?

A I can only guesstimate two hours, maybe a little less than that.

Q And then it was returned where?

A It went to the Unit 1 control room.

Q And Mr. Mulleavy went to the Unit 1 control room?

A That is correct.

Q And as you understood it, the responsibilities of the ECS director were the same in all three places?

A That is correct.

Q Monitoring teams were dispatched from all three place?

A Monitoring teams were dispatched from the HP lab in Unit 1. Once they were out, it was just a matter of communicating with them.

Q They continued to communicate with the ECS director wherever he was?

A That is correct. And the choice of the Unit 1 control room was primarily because the communications capabilities were there.

Q Do you know how the monitoring teams were advised of the shifting location of the ECS?

A I don't know how they -- I could only imagine it was via the radio. They were in constant communication.

Q When the ECS was moved to the Unit 2 control room -- strike that.

After the ECS had been moved to the Unit 2 control room, to your knowledge were repair party teams sent out?

A I don't recall when repair party teams were originally sent out. I know they were in subsequent days. I don't recall on March 28 what repairs were necessary.

One of the -- I think a key point here is that the emergency repair party or the directing of the repair work became a function of the personnel in the Unit 2 control room and specifically under either Dan Shovelin or Dick Seiglitiz, primarily because one of the things that we had initially done after the 7:00 o'clock problem was to close the door between the two units so that we would minimize the impact of the radioactivity on Unit 1.

And it made it impossible to enter the Unit 2 auxiliary building from the Unit 1 control point; so therefore it was a matter of necessity that the individuals had to be directed from or depart from the Unit 2 control room to enter the auxiliary building.

Q Were you aware when repair party teams were dispatched from the Unit 2 control room?

A I was aware of the dispatching of repair party teams and operators from the Unit 2 control room.

Q When they were dispatched, who, if anyone, had any health physics or radiological protection role or function in determining what they would do, what the precautions they would take were?

A In the majority of the cases, I was involved in

pv DAR

discussing with the groups or, in some cases, it was single individuals, the radiological assessment and the protection that they should take.

I was not about to send any HP people in with them, because it would only double exposure. I didn't think that it was a viable thing to do.

We also had HP technicians there that I am sure interfaced with them, though I can't be specific. I have also been made aware that there were some that didn't have any interface.

Q Did you have any role in attempting to control ingress and egress? Strike that.

Did you have any role in controlling ingress to and egress from the control room?

A No, not -- no specific role in controlling personnel getting to or from the control room.

Q What about entries into various plant areas which had or might have had or were likely to have high levels of radiation?

A Well, the personnel entering the areas -- and that was primarily the auxiliary building -- were being dispatched from the control room. As such, we had interface with most of the people that went in.

Again, I have been made aware subsequent to the event that there were some that had interface only with their

pv DAR

shift foremen and possibly with some of our technicians, but I can't be positive on that.

Q To your knowledge, were any emergency repair teams dispatched by or supervised by the EOS director during the incident?

A I don't know. I don't recall.

Q Did you have any role in making decisions or being consulted with respect to decisions on operational matters during the emergency?

A Yes.

Q Specifically, were you consulted with respect to the venting of the makeup tank?

A Yes.

Q Can you tell me about that?

A Well, first of all, all decisions that were made were made by Gary Miller. But the mechanisms that they used to make the decisions was to periodically — and I would say about every half-hour to hour — call a group of individuals into the shift supervisor's office. And those individuals consisted of those that I have previously named, those speaking directly with them: Mike Ross, George Kunder, Jim Seelinger. It also included Rogers from B&W and myself, and occasionally Bill Zewe would be involved. And each time we met we discussed the plant situation, where we thought we were, what we thought we could do to continue in our efforts

to move the plant to a stable condition, relevant to the venting of the makeup plant.

And the first venting took place, I believe, on the afternoon of March 29, and it was out of necessity in that the makeup tank pressure increased -- driven the pressure up to the point where the relief valve was going to lift anyway. And in order to maintain our ability to use the makeup tank for high-pressure injection and system temperature-pressure control, we had to be able to keep that relief valve from lifting.

And rather than let the relief valve lift, it was determined that the best way to approach it would be to open the vent from the makeup tank to the vent header.

I was involved, of course. I really couldn't predict what kind of radiation release would take place. So it was a matter of as the relief valve was lifted, monitoring some of the strip charts that we had, to see specifically what type of effect it had.

I was involved on the periodic opening of the vent on March 29. On the 30th, I arrived just after the makeup tank vent was opened for continuous venting. Specifically, we were working on a 7:00 to 7:00 shift, and I had the days and Tom Mulleavy had the nights.

When I arrived, it was about 7:15 or 7:30, when I got to the control room; and the makeup tank vent was already

open. I was made aware of it being open. I looked at the strip chart and recognized that the relevant readings on March 30 were much lower than the readings on March 29 and March 28. So I felt fairly confident that it was not a major concern.

And that was about the extent of it until I heard about seven hours later that it had caused an evacuation or at least began the move towards an evacuation, which quite surprised me.

Q With respect to the intermittent venting which began on the 29th, was Mr. Ross involved in the meeting with Mr. Miller and others?

A I would imagine so. I don't recall specifically.

Q Do you know who actually turned the knob or operated the valve?

A It would probably have been one of the control room operators on the panel.

Q Do you know who gave the order to the control room operator?

A It would have been either the shift supervisor or foreman.

Q By name, do you know?

A I don't recall. I am just trying to think who the people were up there those days. We went through so many shifts that I — it is impossible to know which one was on

pv DAR

at that time.

Q Was it your understanding that the venting of the makeup tank in the way that it was done was not a routine procedure?

A By "routine," something we would do in normal operations? We do vent the makeup tank periodically during normal operations if we determine that in fact we don't have a sufficient amount of hydrogen over pressure and we may have some nitrogen in the makeup tank. It is a mechanism to sweep the nitrogen off, and it is something that is done under those circumstances.

But it's not typically done, nor do I know that it has ever been done due to fears of lifting the relief valve.

Q Was there concern that there would be a release of radioactive material as a result of the venting of the makeup tank?

A Sure.

Q Why would that have occurred?

A Only because everything else we did caused a release of radioactive material. It was a natural concern, I think. I don't know any specific reasons in the first attempt, other than everything we did we were concerned with and we monitored very closely. And after the first time we opened and recognized that it did in fact cause a release from that point on, it was a matter of

always monitoring that release, knowing it would occur.

We had a difficult time pinpointing exactly why, and I don't believe to this day that it can be specifically determined, although it's -- we know that it is a leaky valve on the system.

Q Before the first release, were you asked to predict the amount of radioactive material which would be released or the level of exposure?

A No, I don't recall.

Q Was there discussion in the meeting with Mr. Miller of attempting to make such a prediction?

A I don't recall.

Q What do the strip charts show?

A Well, first of all, the method that we were using to monitor was to look at a couple of area monitors that were in the vicinity of the ventilation exhaust ducts. The actual effluent monitors were all pegged so they provided no usable information.

So, it was just a strict gamma reading external to the exhaust stacks that was giving us a relative reading.

And specifically, what I was looking at did show an increase in radiation level to a plateau, as we were venting, and then when you closed the vent it gradually died off, or fairly rapidly died off within a matter of 15 or 20 minutes.

Q How many times, if you know, during the 29th was the makeup tank vented?

A I don't know specifically, but I know it was several, half a dozen or more.

Q Was there a meeting with Mr. Miller preceding each venting?

A No. Once we had done it a couple of times, we defined a preplanned method when, at what pressure the operator would open it, how long he would keep it open or, I believe what -- and I can't be positive, but I believe it was at what pressure he would open it and at what pressure he would close it. And additionally, it required constant monitoring of the radiation monitors and things of that nature.

But it was a predefined procedure that was laid out after doing it a couple of times. And from point on, it became a routine.

Q. The standard for opening and closing was based on pressure levels, is that correct?

A. The opening was based on pressure level. The closing, I think, was based on pressure level. It was either pressure level or time. I think it was pressure level.

Q. There was also monitoring of the strip charts?

A. Yes.

Q. Was there a prescribed level of release which would have caused the venting to stop?

A. We did not have a pre-defined level of release. We did have a continual watch and all of the information was provided to either myself or Tom Mulleavy on the first vents. What we were most concerned with and -- the release itself was not the specific parameter of concern. It's the release time, the dispersion, et cetera, to what sort of off-site doses are we causing, and in our releases we were more concerned with what were our on and off-site people measuring to tell us whether or not what we were doing was going to be a viable method of relieving the pressure.

Q. Do you know whether there was any communication with on or off-site people prior to intermittent venting to alert them to that fact, so they could conduct some sort of monitoring?

A. We had established communications to do specifically that, and as a matter of fact, not just the makeup tank vent,

but we had established the mechanism that prior to doing anything that had release potential for causing additional releases, we notified the monitoring teams to be aware, get in position, get ready to take the samples; and also got the helicopter up. It became a standard operation.

Q. Did you have the helicopter up on March 29th with respect to the makeup tank?

A. I can't be positive, but I think we did.

Q. Who made the calls or the communication with the monitoring teams in the helicopter?

A. The ECS, which had taken up permanent position in Unit 1. Now, their communication I don't believe was directly to the helicopter pilot, but rather to the observation center. Somebody over there had contact with the helicopter pilot.

Q. And at this point in time, you and Mr. Mulleavy were alternating in the control room?

A. Right.

Q. Who was running the ECS?

A. We had established a rotation of individuals that included Len Landry, who is a health physics engineer who works for me; Bev Good, is a health physics engineer out of Reading; Lex Tsegaris, who formerly he worked at Three Mile Island in the capacity of the training supervisor for several years and had been intimately involved in the emergency plan, and at the time of the accident was a maintenance supervisor

at one of our coal-burning plants. He had been brought down to assist in the operation of the ECS.

I don't -- we also had some other people from other plants. I recall Bill Allen, who is my counterpart up at the Susquehanna site. He was in the ECS as a director at times. Syd Porter, a consultant, was there at times. So it was a combination of any one of those individuals at any given time. And who specifically was there at the time, I really couldn't tell you.

Q. Prior to a venting of the makeup tank, did you, when you were on duty, make the call to the ECS, or did you direct someone else to make the call to the ECS?

A. I think it was a combination. I spoke with the ECS on many occasions and I feel confident that at least on one or two occasions I spoke directly. But I also feel that we probably had one of the CROs as time went on, and it became more of a routine. The CRO was, I believe, the guy making the call.

Q. After a period of time, would it be fair to say that you were not directly involved in any of the communications with respect to the intermittent venting?

A. I don't think I can say that I was not involved. I was aware of every time they vented when I was in the control room.

Q. But you did not make the calls after a period of

time?

A. I may have made some.

Q. You did not make the calls in all cases?

A. That's true.

Q. Did you not direct someone to make the calls in all cases?

A. I will agree that that's probably a correct assessment.

Q. And did you not yourself monitor the strip charts?

A. I did monitor them. But we also had an operator specifically assigned to do that.

Q. In all cases, did you direct the monitor to monitor the strip chart?

A. No, he was -- it was pre-planned. Again, as it became a relatively routine operation, he was a prepositioned individual.

Q. What specific charts were read?

A. The two in question that were giving us the best information were HPR-3632 and HPR-3640, which are two gamma monitors that sit in the vicinity of the auxiliary building exhaust duct and fuel handling exhaust duct.

Q. Was it your view that they were giving you a reliable indication of the releases?

A. I was using them as a relative indicator. They are our trend indicator, and I could tell at this time that it

was either more than, less than, or the same as the last time, but from a standpoint of being able to put a quantitative assessment on it, no, I did not use them that way.

Q. And you did not see a trend which made you feel it was necessary to get a further quantitative assessment? Is that a fair statement?

A. No, I did not. That is a fair statement, I didn't see a trend. As a matter of fact, after the first couple of releases, the trend was such that I felt very confident that we were at least headed in the right direction. The releases seemed to be relatively consistent, and with time they seemed to -- although you couldn't see it from one to the next, over several they appeared to be a decreasing trend.

Q. And your testimony is that the trend went down on the 30th?

A. When I arrived in the control room on the 30th, the continuous venting of the makeup tank was already in process. I looked at the strip charts. I recall the fact that I was not concerned, because the relevant levels were less than the levels of those monitors on March 28th and also on March 29th when we began the periodic venting.

I felt very comfortable that -- well, I'm only looking back now, but I recall not being concerned about it, because of the relevant levels.

Q. Now, you're aware that there was a large release

when the vent was permanently opened?

A. I am not aware that there was a large release. I don't believe there was a large release.

Q. I'm sorry. Was there a reading of 1200 MR above the stack?

A. I was not aware of it at the time. I am aware of it now. I also am aware that that was a measurement made directly in the exhaust gas, closer than any other measurement had ever been made, and therefore I don't know how we can compare it with any other reading. Readings in similar locations to other readings, such as at the site boundary, were consistent with what we had seen and very, very low.

Q. Are you saying that you think that the 1200 MR reading was inaccurate?

A. No, I believe it was an accurate reading, but I believe it was right in the source term. In other words, the reading was taken only a matter of 100 feet or more, that order of or that level of directly above the stack, whereas in the previous days I don't believe we had any readings directly above the stack like that.

Q. So your inference would be, if you had had previous readings, that they would have been as high as the one on Friday?

A. I believe so.

Q. And that they were then dispersed fairly quickly?

A. Yes, yes, a factor of 1,000 between the stack and the fencepost is not at all out of the question. I think that's a really conservative factor to the fencepost.

Q. I want to show you a document that has been introduced in another deposition as Exhibit 7. It is a one-page document, handwritten, entitled "Venting MU Tank Gas Space to Vent Header."

Have you ever seen that document before?

A. I can't say that I have or have not.

Q. Do you know whether the procedure that is reflected in that document is the procedure that was employed in venting the makeup tank intermittently on the night of the 29th?

A. It appears to me -- and I haven't read the whole thing -- it appears to me to be the procedure that was used.

Q. Do you recognize the handwriting on the document?

A. It looks familiar, but I can't place it.

Q. It is not yours?

A. It is not mine, no.

Q. Do you know whether it is in Mr. Miller's hand?

A. It is not Mr. Miller's handwriting.

Q. Is it in Mr. Mulleavy's handwriting?

A. No, it is not in Mr. Mulleavy's handwriting.

Q. Do you know whether it is in either Mr. Floyd's or Mr. Ross'?

A. I cannot be certain. At first guess I thought it was

Mike Ross' handwriting, but I'm not an expert on his handwriting. I know Mr. Mulleavy's and Mr. Miller's very well, and it's not either of those.

Q. When you left on the 29th, Mr. Mulleavy took over for you, is that right?

A. At what point? I left twice on the 29th.

Q. I'm sorry. Let's take the first time. What time did you leave?

A. I left originally at approximately 6:00 o'clock in the morning, 6:30. And Mr. Mulleavy did not take over for me at that time.

I don't recall specifically who did, but that we had foremen coming in, and I believe at the time that I left there was a foreman on his way and that I had a senior technician in the control room who was in charge until the foreman arrived. But I have no positive recollection of who that individual was.

Q. Then you returned sometime after noon on the 29th?

A. That is correct.

Q. And during that afternoon or evening when you were present, the decision first to vent the makeup tank was made?

A. On the 29th, I believe that to be true.

Q. And then some time in the late evening of the 29th or the early morning of the 30th, did Mr. Mulleavy relieve you?

A. Tom Mulleavy relieved me at some time after 7:00 in the evening.

Q. When the -- when he relieved you, did you and he have any discussion of the venting of the makeup tank?

A. I don't recall.

Q. And you relieved him the next morning?

A. I relieved him at approximately 7:30 the next morning.

Q. Are you aware of any venting of the makeup tank which took place on March 28th?

A. I have to admit right now that the timing totally escapes me. I can't put it in a chronological sequence.

Q. Were you aware of any venting of any other vessels on the 28th?

A. Venting to atmosphere?

Q. Yes, sir, directly or indirectly.

A. No, I'm not aware of any direct or indirect venting of any other vessels.

Q. Would that also be true on the 29th and 30th?

A. That's correct.

Q. Were you aware of a 3,000 MR reading per hour above the stack at approximately 2:00 p.m. on the 29th?

A. No, I am not.

Q. Are you aware of a -- strike that.

Were you aware of a 1200 MR per hour reading above the stack in the morning of the 29th?

A. No, I am not.

I would like to also add that I have not been made aware of those two numbers, even subsequent to the events, up to this point. I was not aware of them at those days.

Q. You testified that during the response to the incident other persons became involved in relieving some of the load on you or words to that effect, is that right?

A. Right.

Q. Was one of those persons a Mr. Graber?

A. Bill Graber was one of the individuals at the observation center. And I would not say that he or anyone at the observation center was taking any of the emergency response responsibility from the people in the plant, but rather, they were a support group to provide manpower, scheduling, logistics, supplies, that type of thing, rather than taking over responsibilities.

Q. Was Mr. Graber, as you understood it, designated as the person in charge of health physics during the emergency?

A. I had heard that he had been designated as being in charge of the HP support function. There was never any question in my mind that the in-plant health physics was the responsibility of those of us that were in the plant, and specifically Tom Mulleavy and I and our -- on our two shift rotations, and subsequently we got into a four-shift rotation with two of the foremen being added to our rotation.

Q. What role did Mr. Limroth play in the emergency response?

A. Again, he was similar to Mr. Graber, in that he was at the observation center. He was providing support.

In other words, when I needed more instruments or respirators, I didn't have the time to chase him down myself, I just called them and let the people at the observation center provide that kind of support, setting up compressors to refill Scot air packs, that sort of thing, supportive role.

Q. Did you have any discussion with Mr. Graber about what his role was to be?

A. No.

Q. Did you ever have any discussion with Mr. Limroth about what Mr. Graber's role was to be?

A. I -- for the first couple of days, I guess going into about at least the fifth or sixth day, all of my discussions with those individuals -- and it was primarily with Dave Limroth -- were strictly, I needed this, I needed that, when am I going to get it, type of discussions. I really was not concerning myself with what type of an organization was being established, but only in that my needs were being filled.

Q. Did you ever have any conversation with Mr. Herbein about Mr. Graber's role?

A. No.

Q. Did you ever have any conversations with anyone higher in authority than you about Mr. Graber's role?

A. No, I did not.

Q. Let me show you part of one of the appendices to the investigation into the March 28th, 1979, Three Mile Island by Office of Inspection & Enforcement, a document which we have been discussing. It is page 2-A-58, and it purports to be a part of a chronology of the event. I just want to direct your attention to an item at the top of the page relating to measurements taken by helicopter, and ask you if that refreshes your recollection in any way as to a reading of 3,000 MR or 3 R per hour that was made during the 29th?

A. It does not. I have to admit I have not read -- gone through all of these appendices with an item by item evaluation. Again, I don't recall that particular number, either on that date or subsequent to it.

MR. DIENELT: Off the record.

(Brief recess.)

MR. DIENELT: Let's go back on the record.

BY MR. DIENELT:

Q. Am I correct that Mr. Limroth became employed at TMI about December of '78?

A. He was employed a few months earlier than that, but was in a training capacity, if you will, until December, at which time he took over official responsibilities.

Q. Now, prior to the time he took over official responsibilities, your immediate superior was Mr. Miller, is that correct?

A. I don't really recall what the chart showed, but basically, prior to Dave Limroth coming in, I originally reported to, directly to the Unit 1 superintendent, and then when the second unit came on I reported -- I believe the charts were changed to reflect that I reported to, directly to Gary Miller. But in practice, the reporting had to be to both unit superintendents, because I was supporting each of them.

Q. And these were who?

A. The Unit 1 superintendent at the time was Jim O'Hanlin, who is no longer with us; and the Unit 2 superintendent was Jim Seelinger in an acting role.

Q. Now, would Mr. Limroth -- when he assumed official responsibilities, how did your reporting or communicating responsibilities to your immediate superior or superiors change, if it did at all?

A. In practice, the health physics and chemistry support of the units did not change. My reporting did not change in practice.

The major change was in the administrative functions of the department in that I now had a superintendent that I could go to for personnel matters, budgetary matters, things of

that nature.

Q. What is your understanding of the reason or reasons why Mr. Limroth was brought in?

A. I believe it was -- he was brought in because of the -- there were several groups on the Island, including health physics and chemistry, others being such as "admin," the budgets group, the computer group that supported both units, and in their support of each unit, they were kind of in an area where they had no direct supervisor to go to for their own administrative concerns, other than Gary Miller, who was at the level that he could not adequately support all of us simultaneously.

So it was a single individual that had direct responsibilities in all of those areas, but understanding that in practice each of those areas, as supporting two units, practically reported to the unit superintendents.

Q. Mr. Limroth reports to Mr. Miller?

A. That is correct.

Q. What was your role, if you had one, in response to the incident beginning on March 28th, in connection with any samples or surveys of radioactivity within the plant?

A. Well, we as an organization were trying to establish radiation level, airborne activity levels, contamination levels throughout the plant at every opportunity that we could. We did not go out of our way to make specific

entries just to do that, but if entries were going to be made for another purpose, we would use that as a time to gather as much radiological information as we could. And I was directly involved in gathering of that information, and to the best of our ability using it.

The biggest concern we had was that what you measured at 9:00 o'clock would probably be totally different at 10:00 o'clock. So we never relied on our historical measurements to determine what we were going to be faced with at any given time.

Q. Apart from any surveys or measurments which were made during Mr. Mulleavy's shift or at a time when you were not present, were you aware of any sampling or surveys at the time which took place without your direction or consultation?

A. Sampling, I assume you mean sampling within the auxiliary building?

Q. Yes, sir, within the plant.

A. I think that the sampling within the plant, the surveys that were taken, I was involved or at least aware of the sampling that was going on. I don't think that I can say that I directed all of the sampling, in that I would expect that if a technician had to go into the auxiliary building for a particular purpose, that he would in fact do routine health physics type survey work, just for his own protection, as he went in. And it was that type of

mte 16

information that we would then try to gather to define what type of levels we were faced with.

Q. After the incident, did you become aware of examples of sampling or surveys within the plant which had taken place on your shift or while you were present, with respect to which youwere not aware or had not been consulted?

A. The only question, just to define here -- when you say "sampling," are you referring also to primary system sampling?

Q. Primary system as well.

A. I was made aware after the fact that there were samples drawn of the coolant, and I also must admit right now that I was aware very shortly after the samples were taken that they had in fact been taken, but that I believe that in testimony or questioning by the NRC, I drew a blank on that until my memory was jogged. But there were some letdown samples attempted.

In looking back now, I can recall that, yes, Cary Harner, our Unit 2 chemist, presented some data to me, but it was kind of nonconclusive evidence of pretty much what we knew was happening, anyway.

I don't -- I know that I didn't recognize the impact of those samples on the ECS, for instance. I didn't put the sample with the evacuation of the ECS together until months afterward. If that's what you're referring to, yes, there

mte 17

were some that were drawn while I was there that I did not -- at least I don't recall being aware of before the sample. I do recall now being aware shortly after the sample, that it had been done.

Q. Were you aware of samples that were taken of the primary coolant on March 28th?

A. Yes.

Q. One of these was the one that you just referred to?

A. Right, right.

Q. Was that the first one of which you became aware?

e-3 A. That was the first one that I became aware of, yes.

Q. When you were made aware of it, did you issue any instructions to Mr. Harner or to anyone else not to take any more samples without consulting you or seeking direction from you?

A. I don't recall that I gave that direction.

Q. With respect to any other samples of which you were aware on the 28th, were you consulted or did you give directions?

A. I don't recall any other samples on March 28th, other than the ones I have referred to. The morning samples. I don't believe there were any in the afternoon or evening of the primary system.

Q. Were you aware of a sample of the primary coolant which took place on March 29th?

A. Yes, sir.

Q. That was a sample which led to a contamination of certain individuals?

A. Contamination and overexposure of a few individuals.

Q. You had been consulted prior to the taking of that sample?

A. Consulted in regards to the fact that the sample needed to be obtained, yes.

Q. Were you involved in the discussions of what precautions would be taken to attempt to minimize the exposure or the prospect of contamination with respect to the taking of that sample?

A. No, I was not.

Q. Do you know what precautions were taken?

A. I know now what precautions were taken, yes.

Q. Did you not know at the time?

A. I did not know at the time.

Q. Would it be fair to say that the people who went in to take that sample decided upon what precautions they would take themselves, rather than have the precautions prescribed for them or discussed with them by other persons?

A. That is correct. The individuals drawing that sample were probably the best individuals on site for drawing it and for defining the precautions. They knew the system. It was an HP foreman who is an extremely good practical

field-type HP foreman, and I had --

Q. That was Velez?

A. Yes, sir. And I had an awful lot of confidence that if it could be done, that those were the guys that could do it.

Q. Now, you knew the sample was going to be taken?

A. Yes, sir.

Q. Did you have any role in selecting the people who were going to take it?

A. The role -- my role is that I discussed the taking of the sample with Pete Velez, described the urgency, if you will, or the desire, the need to take it. And I did not specifically appoint Pete to take it, but he indicated that he would look into taking it. And it was his choice, I believe, of talking to Ed Houser, which again, I think was probably was the best choice that could be made, to take the sample with him.

But from a standpoint of defining who was going to take it, I was involved in talking with Pete, but not directly with Ed Houser.

Q. Were you the person who instructed or directed Mr. Velez to either take the sample or to see to it that the sample was taken?

A. Yes.

Q. Who told you to take the sample or see to it that

the sample was taken, if anyone?

A. It was -- there were several people involved in it, and Gary Miller was involved. I can only imagine that the other individuals would be people such as George Kunder and Joe Logan, but there was -- it was more or less my feeling that, based on the discussions of the seriousness of concern about where the plant was relevant to criticality, what kind of shutdown margin we had, what type of reduction in boron concentration we could absorb without going critical again, and even if we were still critical, there were many concerns raised that we may very well have been still critical. And I don't recall that anyone specifically ordered me, but rather, that I was requested to see if we could get a boron, and that the urgency, the concerns, the seriousness of concerns was fairly well evident to me.

Q. At this point, was it the general understanding or assumption among you -- you, Mr. Miller and others -- that there was failed fuel?

A. Yes, absolutely.

Q. Would it be fair to say that your understanding of the results of the discussions you had with Mr. Miller and others was that you were responsible for balancing the need to take a sample against the risk of harm that might occur to persons who would take the sample?

A. Yes, I was responsible. And I also felt that any

individual who would be involved would have his own personal responsibility in doing just that; and that, since we had effectively no idea as to what type of radiation levels we were going to face, it was a matter of decisions that would have to be made as the sample was being obtained, whether we would have to abort it at any point or continue on. And I felt the individuals involved were more than capable of making that judgment.

Q. When you discussed the need for and the possibility of taking a sample with Mr. Velez, did you discuss with him the fact or the assumption that there was failed fuel?

A. I don't recall.

Q. As you understood it, did he at that time know or assume, as did you, that there was failed fuel?

A. I can't believe that anyone didn't recognize that fact.

Q. As you understood it, did he know or assume that radiation levels, although you didn't know what to expect, could be high?

A. Yes.

Q. Did you suggest to him that any shortcuts be taken in the preparation for drawing the primary coolant sampling?

A. No, sir.

Q. Would it be fair to say that you expected him to take all the precautions that he felt were necessary in

taking it?

A. Yes, I think that is a fair assessment. I don't believe that there was any indication of the fact that we needed the sample in an hour, or that we needed it in two hours, or we had to have the results now; but rather, that the results had to be obtained or that there was an urgency for the results to be obtained, and that we ought to be as expeditious as possible.

But I don't recall any words indicating that we either had to do it right away or that -- I feel like I conveyed the message that we had to make the best effort we could within a reasonable amount of time. And how that was expressed, I really can't recall, but I feel that that was the tone of our conversation.

Q. Did you discuss with him the possibility that the mission might have to be aborted?

A. No, I did not.

Q. You assumed that he, as an experienced foreman, would be able to know whether and when to abort?

A. Yes, sir.

Q. I take it it was not your view that there was any life-threatening situation involved as a result of which the sample had to be drawn at virtually any cost?

A. I agree with that. I don't feel that the urgency that was conveyed to me would have at all given us the need

to approach any time of a life-threatening exposure level.

I felt relatively confident that the individuals involved could do the job within the limits of the Code of Federal Regulations, which are well below any life-threatening levels, and in fact, I think that the obtaining of the sample was done relatively close to those levels, and individuals that were over-exposed were not over-exposed very much.

Q. In normal rather than emergency times -- strike that.

Your testimony is that there was no life-threatening situation, either to the individuals who were taking the sample or to the safety of individuals in the plant; is that correct?

A. I didn't feel at any time during March 28, 29, 30th, that we had situations that were or could approach life-threatening or should approach life-threatening; in other words, that the levels that we were seeing were extremely high, but that it would require many, at least the better part of any hour spent in some of those levels, before one would be concerned with life-threatening levels.

I think the approach that we were taking was, we were working with a one and a half rem limitation on entries into the auxiliary building and were able to stay within that limitation fairly well, and that there were a few minor exceptions in the one and a half rem. To be more specific,

it was a limit that we placed, recognizing that one might pick up an additional one rem just trying to exit the area. So we were trying to be conservative and allow for that margin of safety.

Also, in the obtaining of the sample, although I didn't recognize or have any feel for the levels that we would be seeing, I didn't feel that the time involved in drawing of the sample, which was in the order of a minute or two, that we would have to see thousands of R per hour, 2,000, 3,000 or 4,000 per hour higher, or possibly more, before one would be concerned about life-threatening situations in the time frame we were dealing with.

Q Were you or to your knowledge was Mr. Miller or were any of the others involved in the decisionmaking with respect to taking the primary coolant sample on the 29th, of the view that there was a life-threatening situation to the plant or to persons outside the place where the sample was to be drawn, which justified an emergency effort to draw the sample?

A I didn't feel that way and I don't believe that that feeling was conveyed to me by Mr. Miller.

Q In normal times, when it is necessary to obtain a sample or conduct a survey in an area in which it is expected that there will be a high level of radioactivity and some prospect of either overexposure or contamination, is a

radiation work permit required?

A. Yes.

Q. Was a radiation work permit obtained in connection with the drawing of the primary coolant samples on the 29th?

A. No, it was not.

Q. Why not?

A. I don't feel that a radiation work permit could have provided any additional radiological control. It obviously would have served as a good documentation for what happened, but I think -- in our look at the way business was conducted on the days in question, I don't think we recognized the value of the RWP from the documentation standpoint, but from a radiological standpoint, which is the type of -- or the purpose for an RWP under normal conditions, where we can specify to the worker or the individual who is going into an area what the levels are, what precautions he's to take, what kind of clothes, what are his stay times, et cetera -- and March 28th and specifically in the drawing of the sample on March 29th, that was all an unknown, anyway. So we really couldn't write up an RWP that said: This is the radiation level you're going to see, this is the stay time you've got.

There had to be the judgment by the people as they went along. And I think in looking at the techniques that this employed, which was to perform one step and then back off and get exposure measurements, determine what the situation was

to that point, before taking step two, I think was the most reasonable approach that could have been taken.

An RWP, again, would not have increased the radiological controls prior to the or during the event. It certainly would have provided good documentation, and from that standpoint I'm sorry we didn't use the RWPs, and that particular aspect of RWP was made apparent to me around day three or day four, and as soon as it was we got into the -- it was apparent to me, we got into the RWP business again.

Q. In normal times, the RWP does have a radiological control function, is that correct?

A. Yes, it does.

Q. Can you give me an example of how the RWP radiological control function would apply in normal times?

A. Typically --

Q. Taking a sample of the kind that we're talking about.

A. Okay. Typically, any work that's to be done in an area that requires an RWP -- and that is an area, a radiation area, contamination area, or airborne activity area -- the worker would fill out an RWP, a certain section of an RWP that would specify where he is going, what areas he's going to go in, and what he's got to do and who the individuals are that are going to do the work.

The technicians then would do a survey of the area and

determine first of all what radiation levels exist, specifically if there were, for instance, in a room, possible a corner of the room that might have some very hot piping, whereas the work that is to be done is to be done in a separate section of the room. It would specify what areas to be concerned about and not to get into.

It would specify the airborne activity level that would tell them whether they needed to have respiratory protection; and that also would be specified right on the RWP.

If they needed to have a respirator, air line, respirator, Scott air pack, depending upon the magnitude of the activity, contamination surveys that would define what type of protective clothing that might be required; and then, finally, if the job that is being done might cause any of the items to change, such as -- a good example would be somebody going in to grind on a pipe, possibly grinding an old weld out where the pipe would be contaminated. There is an obvious situation where the airborne activity would be of concern.

One might specify the respiratory protection equipment to be worn and possibly a label, air sample, would be worn to document the actual airborne activity levels when the man was working.

It also can go as far as to say, if a particular job is one in which there is a significant radiological concern such as someone might be opening up a primary system component,

we would specify that someone from the health physics organization be there.

Q. As I understand it, before you would issue an RWP, assuming you didn't already know what the radiation levels in the area where the work was going to be done was, a rad chem tech would go in and take measurements?

A. That's correct.

Q. And wouldn't need an RWP for that?

A. The rad chem techs are, except from having an RWP filled out prior to going in to obtain any data, they do in fact document post-entry on an RWP to the circumstances, which is more of a data collection device for historical purposes and exposure tracking.

Q. And also, I take it it has the contemporaneous purpose of letting you know what the exposure levels are?

A. Not really, because the technician would document the levels on a survey form, which is not part of the RWP, but rather, survey forms that are drawn up. We have survey forms, room layouts of every cubicle, every area of the auxiliary and reactor buildings. And what the technician would do is to document all of his findings on that survey form, which would then be filed in the lab and available for, for instance on the next shift somebody wishes to go into that same area, another technician, and could look in and say, yes, there is a survey that is only eight hours old

and that is acceptable for use to the subsequent RWP.

So the information on the RWP, if he were to document that, would only be a redundant source of information, and typically is not the source that we go to for radiological data.

Q. Now, how does the rad chem tech decide what precautions to take before he goes in to measure the levels?

A. The precautions are, basically, if you don't know, you take the conservative approach. Or if you have no reason to suspect that you don't have a problem -- let me give you an example.

It could be you don't know the airborne activity level in an area, and yet you have a gross monitoring system for the whole building which is not showing any specific problems, and, for instance, the room that an individual is entering has no pressurized components where you could have an airborne problem. Judgment would be made by the technician not to wear any respiratory protection equipment to go in.

And on top of that, there is also some historical -- the room had been sampled every day for the last 15 days, and there has never been anything. One would judge that there is no problem. The entry, if there's no -- if there's reason to suspect potential contamination, he would wear clothing in to do the survey.

Obviously, we train all of our techs to enter the room with a dose rate meter first, so they won't be surprised.

We use -- if there is a suspected high level, something like a teletector, where you have a 13-foot telescoping probe to enter, that type of thing.

Q. Let me try to summarize what I understand to be the situation with the RWPs in normal times versus what happened on the 29th during the sample.

Please let me know if I'm misstating the situation.

A. Okay.

Q. What appears to me is that in normal time you would go through essentially a two-step process, send the technician in first, find out what the levels are. He would come out and report the level on an RWP, as well as on a survey form. Then you would prepare another RWP to send the people in to do the work.

A. That's correct.

Q. And in the case of the primary coolant sample on the 29th, you collapsed the two steps into one step, correct?

A. Basically, yes.

Q. And you didn't prepare any RWP before or after the fact?

A. That's correct.

Q. Is it also true that there were no survey forms prepared after the fact?

A. I believe that to be true.

Q. Why were there no survey forms prepared?

A. I don't know that the survey form -- well, I can only surmise that the individuals were more concerned with the situation at hand. Also, recognizing -- and this is more opinion on my part now -- that the individuals were most concerned with the sample, and when they completed their drawing of the sample and analyzing of the sample, the sample was stored in a lead pick, if you will, behind a lead cave.

The radiation levels were far different than the levels that they were faced with while they were in there and was of most concern to them. And I don't feel that any of them desired to go back into the sample room to see what the levels were after the fact.

They had all received enough exposure. The job was done, and that the levels would obviously be different the next time anyone went in anyway.

Q. Do you know whether there was any written record made of the levels which the group found when it entered the room or when it stayed in the room to take the sample?

A. There are records, whether or not there are records -- I don't believe there are any records that exist that were created at that time. There are, I believe, in the NUREG 0600 document reconstructed information relative to the radiation levels.

Most of that information, I believe, is part of the investigation that we did into the incident, using both computer

codes with the activity levels computed as well as mockups and things of that nature, to try and reconstruct all of the information.

Q. I believe you testified earlier that one function that the survey forms ordinarily have is to permit the next person or the next shift who was going to be involved in the same area to know what the most recent reading has been. Is that essentially correct?

A. That is correct.

Q. What mechanism, if any, was there during the emergency to ensure that that function of the survey form was carried out?

A. Okay. We began on March 28th with a series of layout drawings that were used to document radiation levels as found by people making entries into the auxiliary building. In other words, when they came out we would say, what levels did you say, and to the best of the recollection of the individuals and for the most part, I think they were really accurate.

An individual might state that, I went down this passageway to get to the panel that I had to go turn the switch on, and the levels I saw as I passed this point were so much HR per, and when I got to the panel -- and we only use that information that the individual felt confident in; and then started creating a layout drawing radiation map, if you will. But

also, recognizing that we used that as a reference, but we never assumed that because the level was that an hour ago, that it would be that again.

We tried to give the individuals going in a feel for the levels that they would see, but also were very much aware that the levels could be significantly different.

And one of the items that we tried to impose on the individuals was to understand at what radiation levels, if they were to see something abnormally high, at what point they should stop and back out.

In other words, if it was 500 MR per hour on April the 1st and a half R per hour now, is that enough to make a guy turn and run out? It isn't.

Really, unless the guy has a four-hour job in there, which we didn't have -- most of the entries were of the five-minute duration, five, ten minutes. So we tried to talk to them in terms of what number of R per hour would give them how many millirem per minute, and use that as a judgment: Can they stay within their one and a half rem? That was the basic plan.

And I also know, just to clarify the record -- I previously testified to that, that when I left on March 29th in the morning, those records were in the record room. When I arrived on March 29th, they were not there. What happened to them, I have never been able to determine. And immediately

mte 34

e-4

we began creating new survey information. We did not send people into the building for the expressed purpose of determining radiation levels. Our intent was to try and minimize the total exposure and let the worker who was going in do that work for us.

Q. In comparison with the survey forms that are kept in normal times, how were the forms and documents that were created during the emergency different?

A. The only major difference was that the level of detail might be quite a bit less on the -- during the accident, rather than having specific forms for each cubicle, we used a large full layout drawing of the entire elevation. We didn't concern ourselves so much with, it's one and a half R here, it's 1.4 R here, but rather the general area is about one and a half R per hour, recognizing that we were relying more on the individual and his ability to measure when he went in.

Q. Would the normal survey form have been useable for the purpose that you had during the emergency?

A. I don't know that it would have done us any more good than what we had.

Q. Would it have been any worse?

A. It would have probably been similar, because we were not involved in taking detailed surveys. So therefore the level of detail would not have been there, anyway.

Q. Am I correct that in normal times survey forms are filed in a file cabinet?

A. They are filed in a file cabinet.

Q. Or a notebook?

A. Where the most recent survey of any area is available by -- categorized by area, and historical data is pulled and filed in a separate location for review. It's only the most recent data that we are really interested in.

Q. Am I correct that the documents or forms that were developed during the 29th were not filed in the same way?

A. That's correct, yes.

Q. Were they filed in any way?

A. They were actually -- what we did was, we put sheets of clear plastic over these layout drawings, and then used a grease pencil, and when levels were determined to be different, we erased one number and put another number on. So we were losing the historical aspect of it, essentially.

Q. Do you believe that having the historical aspect of it would have been useful in attempting to indicate any kinds of trends or the like?

A. I think that is kind of hard to say. I can't say that it would not have been useful. I would have to go through it again.

Q. Would you have preferred to have the sample form system as it operated under normal times to the system which

you employed during the emergency?

A. I don't think that I would use anything other than what I used as the method. However, I think that I would probably have liked to have had more clerical type people up there to document everything. For those of us who are sitting here today, it would have been very helpful. I don't think on the morning of March 28th that it even entered my mind what was going to be happening two months later, three months later, trying to reconstruct it.

I don't think I would have looked for trends. Things were going on too fast to even try to assess trends.

Q. Are you saying that there simply wasn't time to either do the survey as you would do in normal times or to use the survey for contemporaneous purposes that you would use it in normal times?

A. Well, first of all, the time factor as far as doing the survey was not important as much as the exposure that would have been expected to do those surveys, I don't think was justifiable.

I don't feel on the first day or the second day, and probably through the third day, that the situation was such that we could have had the -- or did have the time to sit down and look at the big picture, the trending of radiation levels, what's happening, can we put the picture together based on radiation rather than based on other plant parameters.

I didn't feel like I had the time. I don't think anyone else did, either, under those circumstances.

Q. Had you been able to make the time or had you had the time, would it have been, in your view, useful to you to know what the trends were?

A. I don't think I can answer that. I think I would have to see what the trends were. I think there is a benefit to having them, but I think that the -- if we are looking for the next accident and how we are going to handle it, I would strongly recommend that -- and I have made this recommendation before -- that there be someone with a health physics background, and preferably somebody who is not familiar with the plant, to stay in the background and watch the big picture. And the reason I say somebody who is not directly familiar with the plant is that I think anybody who is in this position gets caught up by the minute-to-minute happenings and gets too involved and gets dragged into the situation and can't stay back and look at the big picture.

I think -- I personally felt like I had that person beginning on about day four in the form of Tom Murphy, who is an NRC health physicist, who came into the control room and did just that. He stayed back and evaluated the big picture, and he couldn't get dragged into the minute-by-minute happenings because he didn't know enough about the plant or the situations to be pulled in. But he provided

some very, very valuable suggestions to me, because he was able to stand back and watch the big picture, watch the situations developing, and not get caught up in the events.

Q. Do I understand correctly that, regardless of the format, that the recordization, that it took, that persons who went into areas where there were high radiation levels did come back out and record that information?

A. We received a lot of information. We tried, first of all, if an individual went through the building, went from one end to the other to get to a specific location, he probably could not remember every point, but we tried to get at least an idea, and in most cases were able to get two or three very firm numbers that he had confidence in in their travel, as well as the information in the direct vicinity that the work was performed. And we did.

I don't feel that we got 100 percent of that data back, but we did get an awful lot of that data back and tried to construct the picture on what we did get back.

Q. Was there one person who was responsible for getting the people who had just gone through an area of high radiation and finding out what levels they had recorded and putting that down?

A. At various times there were different people, but there was a technician typically assigned to do that.

Q. Did you make that assignment?

A. I did on several occasions, yes.

Q. Who else?

A. Tom Mulleavy on his shift.

Q. So it would either be you or him?

A. Yes.

Q. You indicated that you had a layout with a plastic cover over it, on which you used a grease pencil. That was during the 29th?

A. That was on the 29th. I recall that, and then subsequent to that we continued with that type of approach. Eventually, we put the large drawings up on the wall and plasticized them for more convenient access for our people.

Q. When you came back, then, I believe on the 30th, and found that the chart that was being used was gone -- did I misstate you?

A. Yes, you did. I came back on the 29th. We had drawings on the 28th where we were recording the levels. When I came back on the 29th, I found that they were not in the control room or they were not to be found readily, and we began new charts.

Q. The plastic was gone and the chart was gone?

A. The charts on the 28th, I don't believe were covered with plastic. But I think, rather, we were just penciling them in. I don't recall specifically. I don't believe they were covered with plastic. I think that may have been the

reason why we put them a little bit more permanently on the tabletops and to the walls.

Q. Are you aware of any abbreviated RWP form to be used in emergency situations?

A. I'm not aware of one, no.

Q. Was the sample room or the area in which the sample of primary coolant that had been taken was stored, posted as a high radiation area?

A. Yes, sir, it was.

Q. Were you aware of an entry that was made by Mr. Janouski into the auxiliary building or a survey which was taken by him in the auxiliary building on the 28th?

A. I am aware that he made a run through the building, did some surveying in the early morning of March 28th. I don't recall the specific hours after the event had begun. I don't recall any of the numbers offhand.

MS. RIDGEWAY: Mr. Dienelt, could I ask you to please clarify, are you aware of a survey on the 28th as to whether the survey is on the 28th or whether he was aware on the 28th? That is sometimes confusing.

MR. DIENELT: That's fine. Let's clarify that.

BY MR. DIENELT:

Q. Were you aware, prior to the time that Mr. Janouski went through the auxiliary building on the 28th, that he was going to do so?

A. I don't believe I was.

Q. Did you become aware of the fact that he had done that on the 28th?

A. Yes, I was.

MS. RIDGEWAY: Thank you.

BY MR. DIENELT:

Q. When did you learn that he had done that?

A. I learned of that some time on the morning of the 28th, I would estimate within maybe an hour after he had made the run-through.

Q. Do you know what precautions he took before he went through the building?

A. No, I do not.

Q. Do you know whether anybody told him to take the survey?

A. No, I do not.

Q. Do you know to whom, if anyone, he reported the results of the survey?

A. I don't recall that he reported the results of the survey as much as his -- if I recall properly, his purpose in going through the building was to ensure that it was in fact evacuated. And I recall him indicating to me some levels of radiation, but I don't know that he documented thoroughly what he had seen, or that he gave me all of the information. I recall him giving me some information on it.

Q. Am I correct that there was no RWP obtained for this?

A. That's correct.

Q. And was there a survey form prepared for it?

A. Not to my knowledge.

Q. Was there any kind of documentation, to your knowledge?

A. No.

Q. During the 28th and during the time that you were present on the 29th, what control, if any, did you directly or indirectly have over entries into the auxiliary building?

A. We did not have absolute control. Most of the work that was going on in the form of either operations events or maintenance events were discussed in the control room prior to the event taking place, and we were aware as they -- as the discussions were going on, of these particular entries. And in those that we were aware of, we ensured that we briefed the individuals.

Again, I felt at the time that we were aware of the bulk of the entries. I thought we were aware of all of the entries, and found out subsequent to the event there were other entries made, as directed by shift foremen, that I did not have an awareness of.

I can't speak for the fact that any or all of my technicians that were in the control room knew of them, either.

Q. Was the auxiliary building the building in which the highest levels of radioactivity were found?

A. Yes. Of course, understand that the reactor building was higher, but we weren't going in it. Yes.

Q. What was the highest level or the highest reading in the auxiliary building of which you were aware?

A. On March 28th or during the entire evolution?

Q. Let's take March 28th.

A. I believe we heard or saw numbers as high as 100 R per hour in a specific location up in the -- 328 elevation back in the northwest corner, where there is a penetration through the floor, a large penetration through the floor for equipment access, where we -- I believe that the dose rays were created by the fission gases rising through this penetration.

And those numbers were obtained primarily by putting a probe out over the opening.

Subsequent to that, we measured levels as high as 750 R per hour at the door entrance to the makeup valve alley.

Q. At any time, were you aware of readings or exposure rates as high as 1,000 R per hour?

A. Other than on the primary coolant sample, I don't recall. Of course, I'm fairly confident that if anyone were to go up in the makeup valve alley, one would have seen levels in excess of that seen. We had seen 750 R at the

door, but I don't recall today that there are any numbers that high.

Q. Were there monitors inside the auxiliary building which had pegged?

A. We had monitors inside the auxiliary building. Most of the process monitors had pegged. I don't recall that any of tha gamma monitors had pegged, those that were in the auxiliary building, but I could be mistaken. I know we had a problem with some of them failing. But I could be mistaken on that. I don't recall.

Q. Did you issue any instructions on the 28th or on the 29th, when you were present, that no entries should be made into the auxiliary building without notification of you or of someone in the control room?

A. I don't know that I issued that direct instruction. I recall talking to the -- there were two operations foremen that were in charge of assignment personnel to tasks, and I can recall talking to them to get them to make sure that everybody that was making an entry came through the HP group. I don't recall that I made a specific directive.

Q. Who were the two foremen?

A. Well, the names of the two people I recall were Fred Scheimann and Carl Guthrie. And of course, those foremen changed on a shift rotation, also, so there were other individuals. But those two I recall talking to.

Q. Do you know the names of any control room foremen or personnel who were responsible for the entries into the auxiliary building which you later learned about, but which you did not know at the time?

A. I don't know the names of any individuals in the control room that were responsible for those directives. I don't think I could honestly answer that.

Q. Were you aware of any instruction which had been given to change a seal return filter some time during the incident, which led Mr. Velez to refuse or refuse to permit a technician to make the change, because of readings of 100 or 1,000 R per hour?

A. I question the seal return filter. That might be correct, but for some reason I think it was a makeup filter. But that is besides the point.

I was made aware subsequent to the event that on one of the shifts and when I was not present, that there was an attempt made to change a filter --and again, I thought it was makeup filter -- where one individual did in fact go down and make measurements. And whether it was greater than 1,000 R per hour, I would imagine -- as a matter of fact, I would expect that in the event of the filter itself, it definitely would be greater even than 1,000.

Whether or not that was measured or not, I don't know.

Q. Do you recall the decision being made not to change

the filter, whatever filter it was?

A. I recall the decision, based on Pete Velez' concerns, was made not to change the filter.

Q. Did you ever learn who the people were who had gone into the auxiliary building without your knowledge?

A. I have been made aware of some of the names.

Q. Did you become aware of any instances of overexposure or contamination as a result of those entries?

A. I was made aware of one overexposure on the days pending following the incident, in the vicinity of March 29th or 30th, but not of the contamination instances until my interviews with the NRC I&E group.

Q. Am I correct that the purposes for the entries into the auxiliary building, both those about which you knew and those which you did not know, was -- were to engage in operational activities, as opposed to someone monitoring or sampling activities?

A. That is correct.

Q. Forgive me if I have already asked you this, but did Mr. Janouski report to you or communicate with you the levels that he found in the auxiliary building when he went through it on the morning --

A. Yes, I recall that he did communicate some radiation levels to me.

Q. I'm going to show you a page II-2358 of the

investigation into the March 28th, 1979, Three Mile Island accident by the Office of Inspection and Enforcement, which we have been discussing and which has been marked as NUREC-0600, and ask you to look at the number that appears circled there.

MS. RIDGEWAY: Which is numbered 3.2.4.9?

MR. DIENELT: Correct.

BY MR. DIENELT:

Q. Is this reference, as you understand it, a reference to the entry or survey which Mr. Janouski made?

A. No, it was not.

Q. This is another survey?

A. Yes.

Q. Do you know who made that survey?

A. I do not know.

Let me just indicate that it states on the morning of March 29th, and the particular survey that I am speaking of was Mr. Janouski, was made on the morning of the 28th. It was very, very shortly after the initial incident, so I would approximate between 7:00 and 7:30.

Q. No one reported levels such as those that are set up on this page to you on the 29th?

A. This particular survey looks much like -- I think these particular levels are not altogether out of the ballpark of the levels that I had been aware of. The two that are

indicated here of 1,000 R per hour, door to makeup, and purification valve room -- again, I think the original question was what were the levels that we had measured in the building, and I think my answer was more towards the highest levels of general radiation levels in the building.

Some of these talk about up -- and on the door of the purification valve room. I don't doubt that at all, that the levels were that high. I think the key was that that was a contact reading with the door, due to the streaming from inside. And we weren't putting people into those areas. So I don't understand what streams four or five refers to.

Q. You agree that someone in the auxiliary building could have been exposed to a level as high as 1,000 R per hour?

A. One could have been exposed, yes.

Q. And you have testified that persons entered the auxiliary building without your knowledge?

A. That is correct.

Q. How long would it have taken for a person five feet from an exposure at 1,000 R per hour to be killed?

A. Well, I think that can only be answered with a lot of qualifiers. And let me maybe give you the situation that most of the 1,000 R per hour measurements were made on contact with a door. And specifically, one that I can recall very well was the entrance to the makeup valve alley, where

you could walk up to the door parallel to the shield wall and parallel to the face of the door, so you could approach it to within a foot of the door and still be in just a 2 or 3 R per hour field, and hold the detector out, and there was a stream of radiation at the door, which the area may have only been about four feet wide, before you hit another concrete wall. So the individual would have to step right into the stream.

But to give kind of an idea as to what level would be life-threatening up to about 1,000 R per hour, with medical attention, an individual can survive. So if you use 1,000 R as, say, the point at which one would be certain to have -- actually, I think we can go higher than 1,000 R. But if we did use that as a point, one would have an hour before one would be concerned about loss of life.

Q. Were you aware of the activities with respect to decontaminating individuals who had received contamination at the time those activities were taking place?

A. No, I was not.

Q. Who, if you know, was responsible for supervising decontamination efforts?

A. I don't believe there was any individual who specifically was responsible for that.

Q. In normal times, when a person has been contaminated, how does the decontamination process work?

A. If an individual is found to be contaminated -- the

HP department -- and that could be a senior technician on a back shift, it can be a senior technician even on days; if a foreman is around, he would supervise the decontamination. Typically, decontamination is not a major problem in that washing with lukewarm water typically will remova any contamination.

There are some specific problems associated with the accident that we had, in that we had iodine levels that were considerably higher than any that we had dealt with before, and we're not really well familiar with decontamination techniques for iodine.

Iodine, if I read the literature properly since the accident, chemically combines with protein, hair and skin, wherever, to make decontamination very difficult. And I think that, again, you're hitting on a point that I feel very strongly about, that we did not do very well, that I think should be described in emergency plans, and that is to have someone -- and I don't think it, again, can be a station individual -- assigned as specifically responsible for decontamination procedures.

An HP from a neighboring nuclear plant might be a prime candidate for that kind of a role. It wouldn't have to be a role that would need to be filled immediately, but say 12 hours after the accident, if you could have somebody set up to take that responsibility and following through, it would

have been a big benefit.

And I think we did a pretty poor job in that area, because of really not recognizing it in our plans prior to the accident and during the accident. Those of us from the plant that could have fulfilled that role were too actively involved in other areas.

Q. Is there a decontamination facility that is ordinarily used?

A. There is a normal decontamination facility. There is one designed in each of the units. Both facilities are at the HP control points. There is no reason why that has to be the facility. Typically, anyplace that you can get warm water would be sufficient.

You might have to rig a facility such that you don't put the waste water into the local drain system, if, say, this were off-site, but rather, collected it. But it wouldn't be a very difficult task.

e-5

kmDA.

Q Am I correct that the ordinary facility was not available for at least part of the time during the incident?

A That is correct. We did use it at times, but it was in the HP lab in Unit 1, which had airborne activity problems during the morning of the 28th. And subsequent to the 28th -- and I don't know exactly which day -- we did get back in and reoccupied the lab. Whether that was on day 3, 4, 5, I don't recall, that it became available again.

Q Were you not involved in the establishment of any temporary decontamination facilities, is that correct?

A No, I was not.

Q Do you know what dose assessment was made of contaminated individuals?

A No, I do not.

Q Do you know whether there were reports made with respect to either overexposures or contaminations?

A If I could back up for one second, I just indicated that I was not aware. I am assuming you were asking relevant to the time in question, being March 28, 29, 30th, rather than subsequent awareness.

I am aware now of detailed reports, but not reports that have been created, oh, through maybe June, July, on the individuals --

Q There were no records of which you were aware that were made at the time?

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A That's correct.

Q There have been subsequent records made?

A On the contamination incident, that is correct.

Q Have you reviewed those reports?

A I have reviewed the recent ones, yes.

Q In normal times, are reports made on overexposures or contaminations contemporaneously with the event?

A Yes.

Q Do you know why they were not made in this instance?

A I can only give an opinion. I just don't think that that was one of the key items in anyone's mind at the time.

MR. DIENELT: Off the record.

(Discussion off the record.)

MR. DIENELT: We have previously asked for copies of reports which have been prepared with respect to instances of overexposure or contamination that occurred during the four-day period beginning on March 28th. Among those reports, so the record will be clear, we understand there are some records which either are being prepared or have been prepared by a consulting company known as Porter/Gertz, and we want to make it clear that our request for reports includes those reports, and also I should add, so that we don't have conflicting requests, that I am

advised by one of my colleagues that our request yesterday was for contamination reports from March 29th through June 30th.

MS. RIDGEWAY: Thank you.

BY MR. DIENELT:

Q Were you aware, on or about April 2, of an incident involving a Mr. [redacted] which led to his contamination?

A I was aware, made aware that [redacted] had been contaminated in the course of doing a maintenance job in Unit 1.

MS. RIDGEWAY: Off the record.

(Discussion off the record.)

BY MR. DIENELT:

A You were made aware of that fact after the contamination occurred?

A Yes, but on the same day of the contamination.

Q Were you involved at all in the decision to engage in the activity which led to the contamination?

A I did not know that the job was even going on.

Q Do you know who authorized the job?

A No, I do not. I am assuming that by "authorization," you mean the Health Physics aspects of it. I do not.

Q Yes, sir.

KnoDAR

A I do not.

Q Were you aware at the time, on March 28th, of the existence of any potassium iodide or potassium iodate at the TMI?

A I was not aware of any potassium iodide on-site. As a matter of fact, I feel very confident that there was none, because I had personally been opposed to it for several years coming on-site.

Q You are saying that you are not aware now of the existence of any potassium iodide on the site at any time after March 28th?

A It's not totally correct. I am not aware -- I am fairly confident that there was no potassium iodide on-site, that had been brought on-site by Met Ed prior to the accident or during the first day. I do know that some consultants or people from other facilities -- and a good example would be one individual from Oak Ridge National Labs, who was given a small container of potassium iodide for use in conjunction with a physician prior to his coming to the site -- but I separate that from being a large quantity that would be available to other or to large numbers of personnel.

Q To your knowledge, no quantity of pills or liquid potassium iodide was brought onto the site by any person between March 28th and April 1st?

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A I don't recall anyone bringing a large quantity on. I don't believe there was any large quantities on-site.

Q At any time?

A Yes.

Q Since March 28th?

A Yes.

Q Specifically, do you recall being aware that the potassium iodide pills had been brought on the site by Electric Boat?

A I am not aware that they did bring them on-site.

Q I want to show you a portion of a deposition of Mr. Graber, G-r-a-b-e-r, which took place on September 6, 1979. I specifically want to ask you to read a passage beginning on line 19 of page 140 and continuing on to line 4 of page 141, and also to read specifically lines 21 and 22 of page 139.

However, you are welcome to read the contents of those pages, or any other portions of the deposition. Have you had an opportunity to read those passages?

A Yes, I have.

Q Does Mr. Graber's testimony refresh your recollection with respect to the presence of potassium iodide?

A It does not. I still can't recall any potassium

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iodide being in Unit 2 control room. I also would like to state that I am not a proponent of potassium iodide.

Q I am going to ask you why not in a moment, but I would like to pursue this, if I may. I will give you an opportunity to talk about that.

Were you aware of the existence of any Lugals solution in kits that were provided by Radiation Management Corporation?

A On March 28th, I don't recall that we had Lugals solution in the kits. I know today that we have Lugals solution available to us. But I am still not a proponent of it. And I have instituted some rather strict controls of it.

Q When did you get the Lugal solution?

A I can't put a date on it, but it was, I would imagine, in May, June type of time frame.

Q Lugal solution contains potassium iodide?

A Potassium iodine, that's correct.

Q Why do you oppose the use of potassium iodide?

A Prior to coming to Three Mile Island, I worked in a nuclear medicine laboratory in a hospital and we were very much involved in the administration of quantities of iodine to patients for diagnostic and therapeutic purposes. And I have seen the effects on people who are allergic to iodine. And I also know that many people, or a number of people, may be allergic and not know it. And that they do not normally

take iodine in such quantities that they could, in fact, see the effects of their allergy.

I have seen people who have what I would consider to be similar to an epileptic fit as a result of administering enought iodine to saturate the thyroid. I don't know how many people I have out in the plant that are allergic. I know I have one and I am concerned that there might be others. I think if it had to be administered, it should be administered with either some very positive knowledge that an individual can in fact take potassium iodide, or with either a physician or a qualified nurse in attendance.

I also have some very strong feelings about the effects, the medical effects of exposure to the thyroid and I think that we do an awful lot of, or have an awful lot of concerns that are based on an historical concern with the thyroid rather than an up-to-date medical concern.

Q Did you ever discuss -- strike that.

During the period between March 28th and April 4th, did you ever discuss the possible use of potassium iodine with Mr. Mulleavy?

A Excuse me, did you say prior to March 28th?

Q Between March 28th and April 4th.

A I don't recall discussing it with Tom Mulleavy. I may have. I don't recall.

Q Do you know what quantities of iodine are used to

KHOJAR

block --

A In milligrams?

Q Yes, sir.

A No, I do not.

Q Do you know how they compare with the quantities that are used for therapeutic purposes?

A On a strict milligram basis -- I know the quantities that we used in hospitals for diagnostic purposes did not saturate the thyroid. The therapeutic doses did. I don't recall what they were in terms of milligrams, but I recall what they were in terms of microcuries.

Q I am going to ask Mr. Lynch to ask you a few questions, if I may, about potassium iodine.

BY MR. LYNCH:

Q I'm really interested if, in your awareness of the relevant magnitude between the use of potassium iodide or iodate or Lugal solution -- they all being different -- the doses that you used to achieve prophylactic thyroid blockage due to radioiodine or for radioiodine versus those levels of iodine that you would be using for therapeutic purposes?

A Well, first of all, the levels that were used for therapeutic purposes were intended to saturate, and I am assuming that the quantities of potassium iodide necessary to be effective blocking the thyroid would, in fact, approach the saturation level.

KROJAR

I think that is the whole principle behind it. So I feel that we may have, in therapeutic or therapeutic purposes, used larger quantities, but in the area of diagnostic I know we did not saturate the thyroid.

Q Are you aware of any recent -- say, within the last year or two -- findings of the federal government that there is utility in using thyroid blocking agents in the event of a nuclear emergency where you have releases of radioiodines?

A I am aware that in some federal document or regulatory guide, et cetera, that it is presented. It is not imposed as a regulation. I also know that it is -- the potassium iodine is a controlled drug, or I should say, the use of potassium iodide in the form such as Lugal solution, comes under the controlled drug regulation. And it is a requirement to have a physician prescribe it.

I know that there are several companies that have been able to get physicians to prescribe it en masse for those utilities. We have not been able to do it, because we do not have a physician on our staff or as part of that under company payroll, so to speak, who would take that responsibility.

Q You are not aware of any pronouncements made by the Department of Health, Education and Welfare or the Food and Drug Administration as to the utility of potassium

KODAR

iodide or iodine in any particular form for use in thyroid blockage?

A I am -- I can't speak specifically to those two organizations. I am aware, and have been aware, that it is something that is considered in several documents, that can be used as guidelines to emergency planning. I don't know, or I don't feel that it is something that is regulated or -- I'm sure it is not a regulatory requirement to use it in an emergency planning.

Q I am not trying to indicate it is a regulatory requirement. I am trying to elicit whether or not you are aware that the federal government has specified a position that it is permissible and even prudent to use potassium iodide or potassium iodate or other forms, to provide iodine for thyroid blockage.

A I am not aware of that, specifically, no.

Q If you were aware of it, and if you had full knowledge of that situation, would you change your opinion on the use of potassium iodide or other forms of iodine for blockage during radiological emergencies?

A I would think before I would change my opinions. I would have to be convinced by a physician. I have gone through it enough in hospitals that I have got enough concern that I will be the first to tell you -- I am not a physician -- I would not personally take that responsibility

KODAR

unless it was fairly well established that the responsibility of either a physician or as mandated by a federal agency -- what you seem to be indicating now is that if, in fact, it were to come out from the Food and Drug Administration, HEW, and had been presented in such a manner that it was -- it would take the responsibility off of me, yes, I think that seems to tell me that there is such evidence to say that, in fact, the quantities -- and under the directive which is put out, that it will be safe.

I am just very, very hesitant to do that without a lot more guidance than I have seen.

Q Is it correct to say, then, that before you had advocated the use of potassium iodide for people under your authority, that you would seek competent medical advice and consent to administer such material?

A I think that is a fair assessment. That would absolutely have to be weighed against the risk at the time. And I think what is important is that I was never concerned about the levels of iodine we saw from a standpoint of extreme thyroid doses, from the standpoint of MPC, yes, in fact, we were concerned, but not from a high level of exposure to the thyroid.

And I guess my answer is more based on the events of March 28th, 29th and 30th, et cetera, rather than on a hypothetical.

k-DAR

Q In that regard, is it your opinion that there was no radioiodine problem either to the on-site or off-site population due to the Three Mile Island emergency?

A If the problem you are referring to -- a significant exposure health problem, yes, I would say that's a fair assumption. We did obviously have a problem relevent to maintaining MPC levels of iodine and that was with us for several months.

Q Did you, at any time including the present, perceive of the potential for a significant release of radioiodine from the plant, that could result in adverse health effects off-site?

A I didn't perceive of that. I think primarily because the iodine problem that we did face was a long-term gradual release, rather than a rapid, large concentration release. And I really didn't see that that was going to change. I feel relatively confident that the control we had was such that it would not change.

Q Would you say that if you put yourself in a position that you were in at the time of the emergency rather than now -- in other words, not enjoying now the information you have received regarding the plant conditions et cetera, I'm interested in your perceptions at the time, whether or not you could have perceived that there was potential for a radioiodine problem.

KODAK

MS. RIDGEWAY: Would you put that in the form of a question?

MR. LYNCH: That was a question, but with clarification.

THE WITNESS: I think I understand it. I think the best answer I can give is that at no time did I ever feel that a large scale release was imminent, or highly likely, or even remotely likely. The possibility always exists remotely that it may be, but I didn't feel -- and I'm looking back at it now more from the standpoint of not being able to remember what I thought, but just remembering what feelings I did have, and that was not one of them. I was not concerned about a major release of iodine. My concerns were more of the long-term low level release of iodine, which kept me in an MPR hour problem, rather that, Do I need to go out and block thyroids around the countryside or even in the plant?

Q And what is the basis for your -- for that assessment?

A The continued or the continual information being provide from air sampling, from stack monitors, from whole body count data, things of that nature, that was available to us.

Also, the knowledge of the conditions of the plant.

MR. LYNCH: Thank you.

kaDAR

BY MR. DIENELT:

Q You testified earlier about the role which a Mr. Murphy from the NRC played in the response to the incident; am I correct that you regarded his efforts as helpful?

A Absolutely.

Q Were you aware at the time of other activities of NRC personnel in connection with the response to the accident?

A Starting on March 28th, I was aware of the NRC personnel who arrived. We had several inspectors that have either previously inspected here or at least who I was familiar with in the Health Physics area, that came in.

We also had some operations-type inspectors that I am familiar with, that arrived, and I think they played an entirely different role than what Tom Murphy played. I was very well familiar with what was going on with those individuals.

Q Would you characterize their role as essentially that of observers?

A That would vary from individual to individual. There were some inspectors that -- and specifically, one inspector that has been my Health Physics inspector here for the last couple of years, that because of his knowlege of the plant, knowledge of the people, did not come in as an

KANDAR

observer. He came in as an assistant and did just that. He provided assistance to us, and was very helpful in feeding back information that he was obtaining to us.

Q Who was that?

A Karl Plumlee. There were others that I did feel did act as observers, primarily because it seemed -- and this is more just kind of an after-the-fact observation on my part -- that those that were most familiar with the plant and personnel were more involved in the events and those that were less familiar with plant and personnel were more observers. And they were involved in the events.

Q You indicated that the question of whether the NRC personnel were observers varied from person to person?

A Yes.

Q Did it vary over time?

A Yes. I think if you compare the percentage of inspectors that were observers on Day 1, and by observers, to kind of qualify that, I mean people who are interested in -- Are you following your rules and regulations? And what is going on? And what does the book say that you should be doing? -- regardless of the context, I think the percentage was very low on Day 1, and increased with time.

In the area of observers -- and I guess I'm going back to being -- I&E inspectors, it increased with time, but there were some individuals that you didn't see a change in.

kenDAR

Roger Zabodowski was an individual who, for weeks on end, because of his plant familiarity, did not appear to me to be playing the role of an inspector, but rather was involved in trying to evaluate situations and to assist in making recommendations as to what we could do with the plant or with the various systems.

But I think, overall, the number of those individuals declined with time, the number of observers increased with time.

Q Are you using the word "observer" and the word "inspector" interchangeably?

A Pretty much, yes.

Q And did you perceive a difference in the role played by the inspectors or I&E personnel, and the role played by other NRC personnel?

A Well, of course the other NRC personnel that I had familiarity with was primarily Tom Murphy, and I think that his role was quite a bit different. I didn't have much contact with any other people outside of Tom. I had some small contact with John Collins, but I really couldn't say anything in that particular area.

Q Were the activities of any NRC personnel a hindrance or a harm to you in your functioning?

A To me personally, I would say no. Other than a generic problem of a lot of questions that were being asked,

there was just not enough time to answer. And I don't limit that just to the NRC people, that was a generic problem with anybody who was not intimately involved with the proceedings from the initiating event right on through. And bringing people up to speed on what was happening was time-consuming.

Q Did Mr. Murphy or Mr. Plumlee or any other NRC person with whom you dealt provide you with advice on Health Physics or other matters with which you were dealing?

A Yes.

Q Did you solicit that advice, or was it volunteered?

A It was volunteered. I didn't think that I recognized at the onset the value of that type of individual. And again, I am speaking primarily of Tom Murphy and his ability to stand back and look at the big picture. He, on many occasions, came to me and said -- gave me two or three items that he felt I ought to have somebody pay strict attention to, or that I ought to pay more attention to.

I didn't actually solicit it, but I found that as time went on, that I found myself going back to him more and more frequently, and just maybe asking, What else do you see?

Q Did you find the advice that he gave you to be helpful?

KANDAR

A Absolutely.

Q Did you follow the advice, in most instances?

A To the best I could, yes. His advice was not specific as much as it was -- as much as it was general, general areas that we should pay more detailed attention to.

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Q Do you have any criticisms of the role which the NRC played in terms of dealing with you, apart from the criticism, if it is that, that on some occasions certain NRC personnel asked too many questions?

A Directly related to me, I think that the -- I don't have a lot of criticism. I don't have any criticism of the way I was approached or treated by the NRC people, but I know that there were a couple of occasions where some of the people I had doing things complained of an NRC inspector being a "hindrance," worrying about the letter of the regulation without recognizing the situation. I think Pete Velez may have given you an example of that.

Other than that, I think my only major concern or criticism is that as time progressed they had phone talkers who did not know what they were talking about, and it made it very, very difficult to get information to Bethesda or whoever they were talking to.

We weren't trying to get the information to them as much as they were trying to get it from us, and I found that in my particular situation, on a couple of occasions, I gave information where the phone talker didn't know what a microcurie per cc was, and I had to spell it out for him. And I had some grave concern about how the message got through to the guy on the other end.

Q Where were these phone talkers located?

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A Shift supervisor's office in Unit 2.

Q What time period?

A Oh, about two days into the event. From that point on. The initial phone or the initial communicator, they didn't have phone talkers, per se, where people such as -- I remember Jim Higgins, who is an inspector, and I had no problems with him. He is very knowledgeable.

I got the feeling that the knowledgeable people were replaced by an accountant or somebody, just a warm body that could relay information. And I think that really it gave me concern that the information was not going to get through the way it should have.

I think a lesson to be learned, I felt, is that the best health physics or the best or the smartest of people during accident conditions are going to confuse things such as a microcurie or a millicurie or a millirem and a rem, and unless you have somebody who is receiving the information who can recognize an unusual number and question it, that number is going to get through the way it was presented, and under those kinds of conditions -- and I can't guarantee that I am going to say the right thing or not -- drop an exponent or give a plus-three rather than a minus-three on an exponent.

I find that with somebody who recognizes the number, if a person hears a number that is way out of sync, he will

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question it and quite often a communications gap will be decreased right then and there.

If the guy doesn't recognize the number, he is going to pass them as real numbers, and by the time they get through several communications, God knows what they are going to look like. I have the concern. I guarantee that it happened.

Q Any other criticisms of the NRC role as it related to you?

A Not directly to me, no.

Q Did you have the impression that NRC personnel were providing a useful service or filling a useful role in connection with activities in the control room which were not your direct responsibility?

A The feeling I had was that the people that I saw in the control room in the early hours and for the first day were familiar faces, and I got the feeling that they were helping, that they were involved and they were providing useful information, useful input and suggestions.

But, again, I stress that most of those people were inspectors that had been with us for quite a while. They not only know the plant, but they know the people and they know who's going to be able to do what, which I think is very, very important.

Q Am I correct that one suggestion you would have

for future NRC role in an incident such as this would be to keep the NRC people who are familiar with the plant and the personnel on the job or to get them to the job, rather than having what primarily can be characterized as "outsiders" come in?

A I think there is a tremendous benefit to do that, yes.

Q Would there be any other suggestions that you would have with respect to the kind of role or activities which NRC should play?

A Well, I think I may have mentioned earlier that there are benefits also to having people who are not familiar with the plant and personnel, but that these people ought, I think, ought to recognize that they can do the most good by staying out of the minute-to-minute activities and step back and look at the big picture. And especially in the area of health physics.

I did notice, as a matter of fact, that when Carl Plumlee came in, Carl Plumlee was totally absorbed by the incident. He got involved with what was happening. He couldn't provide that step back.

I think there is a benefit to having the other, but I think they have got to recognize their role. An outsider without the plant-specific knowledge who tries to get involved, I don't think can do the job; and I think we were

kind of fortunate in both regards -- at least I was -- in that I think that was the type of support I directly had.

Now, there were other inspectors that were at various locations around the plant who were getting involved without any knowledge of the people or the plant, and that was a problem or a hindrance in some areas.

Q For you, Mr. Plumlee played the role of a key participant while Mr. Murphy played the role of an observer or adviser? Or would that be a fair characterization?

A Yes, except I would just like to qualify Tom Murphy's being an observer -- I define as different than some of the other observers that I have talked about. Tom Murphy did not concern himself with the compliance with the letter of the law, compliance with the letter of the procedure, but rather was what you're doing regardless of whether it's directly in accordance with your procedures or in accordance with all regulatory guides and regulations, was it really adequate for good health physics control.

He went beyond the scope -- he really didn't care about what the procedures said; he didn't ask to see procedures or to -- for us to comply specifically with procedures. He stepped back and looked at the way we were doing it and tried to recognize is what you're doing adequate or should it be modified. He really didn't give a lot of advice as to how to modify, but rather gave advice as to what areas

pv DAR

should I concern myself with and figured that I would be capable of determining what modifications should be made. And which is, I think, different from the observer, the I&E observer, that I talked about that I felt some of them were -- and they weren't directly involved with me -- but some of them were looking at the letter of the law, saying, "You've got to do this" and "You're not doing that."

MR. DIENELT: Off the record.

(Whereupon, at 12:25 p.m., the taking of the deposition was recessed for lunch, to reconvene at 1:45 p.m., this same day.)

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AFTERNOON SESSION

(1:45 p.m.)

Whereupon,

RICHARD DUBIEL

resumed the stand and, having been previously duly sworn, was examined and testified further as follows:

EXAMINATION (Continued)

BY MR. DIENELT:

Q Did you have any role in drafting the emergency plan or procedures?

A Yes, I have, over the course of several years, been involved in the updating of the plans.

Q When you came to the plant, was there already a plan?

A Yes, there was.

Q Do you know who prepared that plan?

A I do not know specifically. I do know that pieces of it were prepared by people such as Jack Herbein, Joe Colitz, and Dick Deakin was involved, but it was probably a compilation of many people.

Q When you began work at TMI, was there a single plan for both Unit 1 and Unit 2?

A When I began work, there was only one unit here, and the plan was entirely devoted to Unit 1, and it treated Unit 2 as an adjoining construction site.

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Q Were you involved in the drafting of the Unit 2 plan?

A That's correct. And what we basically did was not to change the plan in its entirety, but rather to filter in the Unit 2 aspect of it as well as updating and exchanging regulations.

Q Was there, as you understood it, a person who had principal responsibility for the drafting of the Unit 2 plan?

A Well, I had the principal responsibility for the drafting, and I had assigned that to Len Landry, who did most of the work on it.

Q You then exercised the review function?

A I exercised both consultation and review, initial review. Final review, of course, was through the PORC systems.

Q Have you ever been a member of PORC?

A Yes.

Q Are you now?

A Yes.

Q Were you on March 28?

A Yes.

Q For what period of time prior to March 28 were you a member of PORC?

A I had been a member of the Unit 1 PORC for several

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years. Specifically, I believe I was first assigned as a PORC member in 1975 for Unit 1, and then at the very onset of the establishment of Unit 2 PORC I became a member.

Q Are you the person who was principally responsible for the changes or amendments to the emergency plan for Unit 2?

A I was involved in a majority of those changes. Of course, understand that anybody can make a recommended change and all recommended changes are evaluated by PORC. But the majority would have come out of either myself or my organization.

Q If someone wanted to make a change to the emergency plan, would that person come to you or to PORC?

A That person would not necessarily come to me. The requirement would be to submit a change to the plan on a standard change form to the PORC secretary who would then distribute copies of the change for review, and then a final PORC meeting would be held to discuss the change and either approve or disapprove, either recommend disapproval or approval to the superintendent, who has a final say.

Q Why, as you understand it, were you the person who was at least initially principally responsible for developing Unit 2 emergency plan and the person who was involved in the majority of changes to them?

A Primarily, because the people have related the

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emergency plan as written to radiological aspects. Emergency plan doesn't deal with plant emergency procedures -- by that, I mean operations procedures -- but rather is geared toward radiological aspects. And it was a natural place, I think, for the health physics group to get involved in that. And I think my predecessor and people before him were also involved heavily in the emergency planning area.

Q Are you a member of the emergency planning group?

A I don't know that that organization is very well defined, to me. Can you clarify that?

Q As I understand it, the FSAR provides for an emergency planning group consisting of the station superintendent, unit superintendent, radiation protection supervisor, and medical radiation consultant.

Are you familiar with such a group?

A No, I am not.

Q Would it be fair to say that you have not been involved in meetings of such a group?

A That's correct.

Q Is there a person who is the medical radiation consultant to TMI?

A There is an organization, which is Radiation Management Corporation, which has several physicians, any one of which could become that consultant at a given time.

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Q Is there one particular person in RMC who you can look to as the medical radiation consultant?

A There actually -- there are two that I am -- that I have dealt with in the past: Dr. Linneman and Dr. Brennan. I don't believe that is the total extent of their staff, although they have access to many others in Philadelphia.

Q Prior to March 28, had you been involved in meetings with state and local agencies to discuss what their response would be to an emergency situation?

A Yes, I have.

Q Was that -- were those meetings frequent?

A Those meetings were typically annually, where we would have a full-fledged meeting, meaning all participants involved. But we also had periodic meetings that might be just Met Ed with a state civil defense, or strictly with the county civil defense or things of that nature.

Q With respect to the periodic meetings, would you be the person from Met Ed to attend?

A I have been one of the attendees from Met Ed. We would typically have two or three people, and the most recent meeting, the station superintendent, Gary Miller, was in attendance.

Q You also were in attendance?

A Yes.

pv DAR

Q What other persons, by position if not by name, typically attended these meetings?

A We typically have tried to get a shift supervisor in attendance, supervisor of operations, other members of the HP group, which could consist of an HP engineer. Most recent meetings that I note, the HP engineer was there. We had representation from our Reading office.

Q Were minutes kept of these meetings?

A Yes.

Q Who was the person who took the minutes?

A I don't remember.

Q Were agendas of these meetings prepared in advance?

A I believe there was. Let me just kind of give you an idea of the way the meeting was conducted. We would send out letters to the various organizations, including the local fire, police, civil defense-type agencies, defining the topics for discussion. And it may have been a really general outline of the topics. And we were more or less trying to keep it informal and allow various additional topics to be brought up if time allowed itself to do so.

Q Were minutes kept of the annual meetings?

A Yes. We kept a list of attendees. We kept a list of items discussed, and we typically would walk away with a list of action items. Usually, as a matter of fact, if I

remember rightly, the form it took was a letter signed by the station superintendent. To whom it was addressed, I don't recall. But the distribution was to all the participants.

Q Were agendas prepared for the annual meetings?

A Yes, fairly similar to what I have just described.

Q What was the last meeting, whether it was an annual or a periodic meeting, which you had attended prior to March 28, 1979?

A I know there was a meeting held in the fall, and the date would be approximately mid-October. I don't recall whether we had any smaller discussion-type meetings, limited number of organizations, between October and March.

The one in October sticks in my mind. That one was the full-fledged, as many as could possibly attend. I think we get fairly good turnout from the state and county organizations, and reasonable attendance from the local.

Q You attended the October meeting?

A Yes.

Q Can you recall what the major subjects of discussion, as you perceived them to be, were?

A Well, the major discussion really was towards the communications between TMI and the off-site agencies which really is strictly a county communications between TMI and the state BRH and a communications network from the county

and local level.

I think the main point of concern was to allow the local representatives to ensure that those local representatives understood that TMI wouldn't be calling them -- calling them but that the communications would be through the state and filtering down the county and local networks.

Q Was there a person designated by the emergency plan as an individual who would be responsible for coordination of emergency planning with off-site agencies during an emergency?

A Excuse me. Coordination of emergency planning or coordination of the implementation?

A Emergency response...

A The emergency procedures defines it to be the emergency director's responsibility to ensure that the communications are established. And from that point on -- and he can specify an engineer operator, the best person he has available to him, who doesn't have other functions, as the individual responsible for the communications, establishing the communications.

And then typically, for instance, all of the radiological information becomes a direct communications between myself and the BRH, and in fact it did that morning, on March 28, although I didn't initiate the original call. That was done by an engineer. He established the communications, and then

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pv DAR

it was turned over to me.

Q He did so at Mr. Miller's direction?

A He was actually directed to do it before Gary Miller actually arrived. So it was under the direction of either Bill Zewe or George Kunder.

Q From that time on, you were the person who was primarily responsible for the communications with the off-site agencies?

A I was directly involved in communications with the bureau of radiological protection, and that was really the extent of my communications. And as far as our plan goes, that's the communications link that we planned to establish and did establish, and we tried to minimize the number of off-site agencies that we talked to but rather leave it to them to maintain communications with other agencies.

Q To your knowledge, was there anyone else that had greater contact with the BRH than did you during the period between March 28 and April 2?

A Let me break that down into two intervals, if you will. The early time from, say, the time of the occurrence to -- until later in the day of March 28 -- mid-afternoon, late afternoon, I don't recall when -- I was the primary communications link to the BRH. And forgive me if I keep jumping back from BHR and BRP. I believe it was the BRP, bureau of radiological protection -- I still refer to the

old organization.

That particular communications function, as time progressed, went to the emergency control station where the off-site monitoring teams were being communicated with. It became part of the ECS' responsibility once we were out of the -- we say once we were in a position where things had to a great deal stabilized, and it became more of a routine type of feeding of information and contact, updating of changing plant conditions.

So, I would say from March -- the latter part of March 28 until April 2 the communications would have been done by the individuals -- primarily the individuals I mentioned before: Len Landry and those people.

Q Was there an individual who was primarily responsible for coordinating emergency planning prior to the March 28th emergency with outside agencies?

A Yes. I was that individual.

Q Would it be fair to say that your activity in coordinating the emergency planning was primarily the attendance at the meetings we have discussed?

A No, I think it was much more than that.

Q What else did you do?

A We constantly reviewed and commented or indicated our approval of changes to the emergency plans of off-site agencies. We constantly looked at our plan for the

pv DAR

interface between our plan and the off-site agencies' plan. We also met on several occasions to discuss changing regulations and the potential impact on our plans.

Q When you commented on the emergency plans of the state and local agencies, did you ever do so in writing?

A It typically was not a -- I don't believe we have ever done it in writing. Most of our memos were in the form of getting together at a meeting and discussing their proposed changes or their intended changes.

We had really little impact on the off-site agencies' plans except from an interface with TMI standpoint, how they did their business and communicated was pretty much left up to them and we weren't in a position to say that we either agreed or disagreed. It was their choice as long as we were content that the interface between our plan and their plan was in fact always consistent.

Q Did you maintain a file of minutes and agendas of meetings with the state or other off-site agencies?

A I have various files on emergency planning, and to the degree that information pertaining to those minutes are in there, I really don't know. I imagine most of it would be in those kind of files.

Q Do you know whether there was a file maintained by Met Ed in which copies of the minutes and copies of the agendas were placed?

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A I don't know for sure. I'm sure, in several areas. One specific file, I don't think so.

Q I take it it was not your responsibility to maintain a Met Ed file if there had been one on the subject?

A Well, I think there is no set definition of what type of information is to be maintained in that area other than, of course, the documentation of meeting the commitments that we have in our emergency plan which would call for a meeting once a year with the off-site agencies. We have committed to that in our procedures. I don't know that it is spelled out in the plan in that detail.

Those -- that kind of information is typically maintained in the training department. Of course, others have copies of it in their personal files to back that up.

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Q When you attended the annual meeting, am I correct that -- strike that.

How, if you know, did the training department get copies of Met Ed minutes or agendas that were prepared in connection with annual meetings with off-site agencies?

A The mechanism?

Q Yes.

A I don't know that I could be specific. Typically, the training department was on the distribution or if they weren't on the distribution, it would be a matter of someone such as Len Landry or myself just providing a copy to them.

Q It would be on a distribution of a letter from Mr. Miller. Is that correct?

A Right, right. I can't be specific on that because I don't recall the actual mechanism.

MR. DIENELT: Let me make a document request. I will try to make it specific. I would like the letters or memoranda of Mr. Miller regarding the meetings with off-site agencies going back to the beginning of Unit 1, which can be found in the training department files.

(Discussion off the record.

BY MR. DIENELT:

Q You testified a moment ago that the principal contact which you had and which you understood you were supposed to have with off-site agencies was with the BRP or BRH?

A That's right.

Q Do you know the extent to which, if any, there was contact from the plant during the emergency with other state and local organizations?

A Other than the official notifications, I don't believe that we had direct contact with other state and local county agencies.

Q In connection with your activities in preparing the Unit 2 emergency plan or reviewing the drafts of that plan which Mr. Landry prepared and in connection with the amendments or changes to the plan with which you dealt, how did you assure yourself, if you did, that the plan and the changes to the plan were in conformance with NRC regulations?

A Well, first of all, we used the NRC regulations as guidelines and secondly, the plan was reviewed on site by an NRC inspector who indicated his concurrence with our plan.

Recognizing that the regulatory guides are not absolute requirements but rather, our guidelines, there were some obvious deviations from the reg guide, but he had indicated his approval and effectively, it -- through licensing chain, a licensing item -- that we had to have an approved plan prior to licensing of Unit 2.

Q Were you ever made aware of any statement from NRC, whether headquarters or an inspector, that the

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emergency plan or any amendment to the plan was not adequate or not acceptable?

A I have heard subsequent to March 28 and as recently, I guess, as in the middle of July, that in fact, someone, and I can only state this as second- or third-hand, someone in Washington had serious reservations about the plan.

I was not aware of that at the time of licensing. I was not aware of it at the time of the accident.

Q Do you know who the person in Washington who allegedly had the reservation was?

A No, and I can't be certain that it is factual.

Q From whom did you gain the impression that there was some person in Washington who had those reservations?

A I don't recall. I believe it to be someone in our own management that had heard it. Possibly, it could have been Lex Sagaras, but I can't be certain.

Q In emergency planning, whether in the context of the actual preparing of a plan or in the context of actually planning to implement the procedures, what role, if any, did persons at the level of Mr. Miller and above plan?

A In the planning stage?

Q Yes.

A I think they played a fairly significant role in that they, as the level of Gary Miller, he's the emergency

director. He had a significant role in reviewing the plan.

Obviously, the thing that the plan has to be tailored to the emergency director's abilities to implement. And Gary Miller was very much involved and actively involved in the review.

And most of the changes that occurred were run through Gary Miller before they were implemented.

Q What was the role played by persons higher than Gary Miller?

A I don't recall there being a very strong role in people -- levels above Gary Miller in the development of the plan. I don't think that there is very much interface whatsoever.

Q Were there persons higher than Gary Miller on the PORC?

A No.

Q Am I correct that the final approval for the plan within Met Ed was the PORC?

A No. The final approval is with the superintendent and in this particular case, since the plan encompasses both units, it would require the approval of both unit superintendents.

The PORC really acts in a recommended approval status.

Q Prior to the March 28th incident, had you been involved in any discussions regarding the possibility of need

to evacuate the public from areas around the plant in the event of an accident?

A I was involved in the licensing hearings for Unit 2 that dealt with that particular item quite extensively.

Q Were procedures set forth in the plan or in the procedures for the evacuation?

A The evacuation of the general public is not the responsibility of the licensee. So we did not have specific plans or procedures for their evacuation, but rather, relied on the state agencies.

Q Was the subject of the evacuation part of the discussions that you had with state agencies in your annual or periodic meetings?

A We have discussed it. I don't recall whether it was a specific topic for discussion in the most recent meeting.

Q Prior to the accident, were you satisfied that the planning for evacuation of members of the public around the plant, if that became necessary, was adequate?

A I don't know that I can honestly say that I had evaluated it as being adequate, not being an expert in the area of personal evacuation.

I felt a high level of confidence in the people at the state and county levels to implement their plans and that I felt they had the right approach to it. They had done it on

several occasions for other than nuclear problems and have done it very successfully.

Q Prior to the accident, had you been involved in any discussions with other plants or other utilities with respect to the role that they might play in providing additional personnel, additional equipment, or other kinds of support in the event of an emergency?

A Prior to March 28th, I don't recall ever being involved in any discussions with other plants.

Q Do you know whether anyone at -- strike that. Do you know whether anyone from Met Ed had been involved in those kinds of discussions?

A I don't know of anybody, no.

Q Was it your view prior to the accident that there were enough persons in the health physics department to deal with an emergency?

A Not knowing how many people it takes to deal with an emergency, I don't think that I can honestly answer that. I am a little bit too much influenced by the events, but I think that I can honestly say that we always had enough people to carry out the plans as defined, and I also feel that the plans that were written and developed and in place on March 28th were heavily weighted towards the ability to monitor and determine the extent of the -- or the impact of the emergency on the general public rather than concerning

AR gsh

itself with the impact of an emergency on the people inside the plant.

And I think many of us were driven towards the protection of the public and away from the protection of our own people.

If you don't mind me speaking in terms of what I think today, I can say that I don't think that there were enough people to do both initially. Whether or not it is necessary to have additional people on the site is something I think that should be looked at real hard, based on the ability to get additional people from other utilities.

Recognizing the need to get people from other utilities and the time-frame they can be obtained would be a strong factor as to whether you need more people on a site at any given time.

During outtages, am I correct that supplementary health physics personnel were ordinarily brought in?

A Yes.

Q What was the reason for that?

A Well, normally, staffing level for an operating plant for the health physics area is quite small relevant to the number of personnel needed for a major outtage.

Typically, when a plant is operating, much of the equipment is inaccessible. Most of our repairs and maintenance is of a minor nature or a preventive maintenance type of nature that does not involve entry into areas that have high

radiological hazards.

During an outtage, that changes quite drastically and I think it is standard to staff for the 11 months that you're supposed to be operating rather than for the 1 month -- that's probably a little bit inaccurate. 10 months versus 2 months that you are supposed to be down for an outtage.

Q Were you aware of any arrangements which had been made with other utilities to borrow personnel from them prior to the accident?

A No, I was not.

Q Were personnel borrowed from, retained from other utilities during the accident?

A Yes, yes, they were.

Q Did you have any role in making the arrangements for them?

A I had some role in that as we recognized the need, we were getting requests from other utilities to determine if we needed help.

And about the same time, almost coincidental with the other utilities calling in and offering assistance, we were recognizing the need for assistance and I, on several occasions, relayed my needs to the people at the observation center and they got the other outfits to supply people.

Q Was there one person at the observation center who stands out in your mind as a person who made the arrangements

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with other utilities?

A I don't know. My discussions were primarily with Dave Limroth. Whether he had someone specifically assigned to do that, I really don't know.

Q In responding to the accident, you also made use of supplementary health physics personnel whom you obtained from other companies such as Electric Boat.

Is that correct?

A Electric Boat provided primarily supervision. They did not have or did not send individuals of the level of technician.

Q Where did you get the technicians?

A They came primarily from other utilities, from technician vendors, as we call them, nuclear support services, rad services.

These are organizations that are in the business of providing health physics technicians used primarily for outtage work.

Q These are sometimes referred to as rent-a-techs?

A That's correct.

Q Can you tell me in general terms how the rent-a-techs and outside technicians from the health physics area were deployed in comparison to the deployment of the in-plant or the normal staff?

A During the accident?

Q During the accident, yes, sir.

A First of all, we tried to get most of our health physics technicians brought into the Unit 2 facility, into the Unit 2 control room, Unit 2 control point, and we completely vacated Unit 1.

We did this because, primarily because we were able to obtain people from nuclear support services who were very familiar with Unit 1 and most of the individuals including the supervisors had very recently been involved in a Unit 1 outtage and had just --

As a matter of fact, within days after the accident, before the accident, had left the site.

So it was very normal for them to assume the responsibilities back in Unit 1. So that allowed us -- our main goal or objective was to get all of our own people involved in Unit 2.

Now we did supply one individual as a communications link, so to speak, to the NSS people in Unit 1. We also tried to get our people out of the environmental monitoring business, our own technicians. We had a lot of our Met Ed employees that were familiar with the area assigned to vehicles that moved the other technicians primarily from other plants around the area.

You had one individual who had familiarity with the local environment and another individual who knew how to take

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samples and do surveys, and putting the two together gave us the ability to get all of our off-site monitoring done and also to get our own people into the plant.

Q What person, if there was one, was primarily responsible for deploying these troops?

A I don't know that there was one single person who was individually responsible. If you are talking about job assignments, who was going to be doing what rather than the actual specific direction, minute-by-minute of those individuals --

Q Yes, sir.

A Okay. I don't think that there was one individual. It was more of a several people recognizing needs and trying to fill those needs.

And if I can again kind of anticipate what you are getting at, I feel very strongly that this is one of the areas that ought to be defined, not only from the standpoint of getting the right kinds of people into the right spot -- I don't think we used the talent that we had available to us as efficiently as we could have. I think we used it to get the job done, but we could have been a lot more efficient and done a lot more if we had somebody who had pre-defined objectives to approach the situation with.

And the other thing which I think was so important was to have somebody who you can look at -- the idea of getting people

on a shift rotation because we, in the first couple of days, just ran into -- we were exhausted, and then looked for someone to replace the guy.

There was very little coordination. It was kind of a rude awakening when you recognize that you had been working for 24 hours and there was nobody fresh ready to come in and take your place. That type of coordination very early on to start seeing that the thing isn't going to be a five-hour emergency, but it's going to last for days, if not weeks, and trying to get people into a rotation where they could get off and get some rest.

Q And I take it that as you understood the emergency plan, it did not designate an individual to play the role which you just described?

A That's correct.

Q Who was the group that filled this role?

A Well, it was a combination of people at the observation center. I know that Jack Herbein was one individual who became acutely aware of the problem, not just in health physics, but in all areas, and was trying to get people to look at this -- how do we best start rotating our people, getting them into shift coverage and the HP area?

It was primarily Dave Limroth who was trying to organize this. But I think, too, that the recognition of the problem didn't really occur until March 29th.

DAR gsh

Q Did there come a time when, as you understood it, the deployment of the troops or the allocation of personnel which you have described, essentially Unit 2, your own people, the Unit 1, the NSS people, environmental monitoring and other personnel, came to pass?

A The question is was there a point in time?

Q Was there a point which you could tell me you believe that the troops were in place according to that?

A I think it occurred over time, but I think by March 30th, maybe late in the day, March 29th, we were effectively into a situation where people knew what their role was and who was covering what area.

Q Do you know whether there were any records of work assignments made during the period beginning on March 28th and continuing through to the period after which the accident was over?

A I don't know of any historical record of who was doing what. I know that at any given time we typically had a list, you know, a notebook in the back pocket that said that these were the six guys who were here and this is what they were doing because it was being updated and all this was thrown out.

I don't think that there is a historical document that shows who was where at what time.

Q Am I correct that there were drills for emergencies

on at least an annual basis?

A That's correct.

Q Had there been more than one emergency drill in 1978?

A Yes, there was.

Q How many were there in 1978?

A I think the number was either 7 or 8.

Q Am I correct that all 7 or 8 took place within a short period of time?

A Over the course of possibly 6 to 7 weeks.

Q Were — strike that. Was there one main drill and a group of preparation drills?

A The way we conducted our drills was, first of all, we wanted to run at least one drill for every shift so that everyone was involved.

We typically ran at least one drill that we called our main drill that was a full blown drill involving all off-site agencies that we invited the NRC to come in and witness.

It was the one that we pointed towards. I guess you could call it a main drill.

The other drills were in many ways preparation for that particular drill in that it got people back in the emergency response way of thinking.

We did not run the same scenario in each drill. As a matter of fact, the scenario for the main drill had not been

run prior to the main drill.

So it was, in fact, a fresh scenario or new scenario.

Q Who was in charge of drills?

A Well, the conducting of the drills -- it's my responsibility to ensure that they are conducted and primarily, we use a combination of people to conduct or to put on the drill as a whole. We have the training department which has -- I don't know the total number -- but at least two or three reactor operations licensed people down in their group that we use to develop the plant scenario.

Len Landry, with the use of some consultants and primarily Porter Gertz developed the radiological sequence of events.

The main purpose is to get those of us that are involved in the actual response to the drill separate from those that are developing the drill, and then we use a combination of training department, quality control department, HP department, and Reading people as drill observers to re-evaluate, critique. And eventually from that, we define areas that we feel we can improve on.

Q Who decides when the drill will occur?

A It's usually decided, the dates are usually chosen by those that are going to be conducting the drill and then approved by Gary Miller.

Q Who selects the scenario for the drill?

A The scenario is developed, as I indicated, and

Gary Miller, typically, as I believe this to be the case in all drills, has an off-site supervisor review it, with the expressed concern being that in conducting the drill, we don't do something like trip the plant or make sure that there is no effect on the operations of the plant.

We typically -- well, it is well defined, at least to most individuals, who is going to -- which shift is going to be running the drill on what day just by the timing and one of the other shift supervisors is usually approached by the training group that develops the scenario and asks for an independent review.

That review then is provided to Gary Miller, not in terms of a specific detailed account, but rather -- yes, I reviewed it and it is acceptable and you are not going to have a problem reviewing the plant. And Gary will accept that as final word.

Q What role did you personally play in either the selection of the day or the determination of the scenario?

A First of all, I don't get involved in the selection of the scenarios because I am typically a participating member in the emergency response group.

As far as determining the date, I am sure that all of us have some input into it. There is more to scheduling a drill than just picking a day.

One of the concerns is that you obviously can't just run a

drill with your operating crew. That requires that operating crew to leave the control room. Even though it may be a simulated problem in the control room, you have to plan that, for instance, the previous shift has to be held over to man the control room while the shift that is responding to the drill has to possibly be evacuated, or something like that.

So there is a lot of interface between the operations department and the training department and the drill schedules are usually provided well in advance to upper management, me and Gary Miller and the other superintendents for their final approval.

Q Would it be fair to say that your role is a coordinator of the drills?

A That's correct.

Q Who determines that operational personnel will participate in the drill?

A I can only guess on that that the training people recognize the need to involve every operations shift. I can only imagine that their interface with the operations supervisor to coordinate the timing of the drills is such that he is sure that he has adequate personnel to both respond to the drill and to continually operate the plant.

Q. It's my understanding that, of the seven emergency drills that have been conducted in 1978, Messrs. Zewe, Federick and Faust had participated in only one, and Mr. Scheimann had participated in none. These were the four people on duty at 4:00 a.m. on the 28th when the emergency began?

A. That's right.

Q. Do you know how it happened that three of them only had participated in one drill, and one of them had participated in none?

A. Well, the fact that three participated in one drill indicates that -- our objective is for every shift to be involved in one. Why Fred Scheimann was not involved in one could have been due to either his being ill, on vacation, or for one reason or another not in attendance at the time the other individuals were involved.

We have not -- our plan is not defined or does not define the fact that every individual will participate in at least one drill, but rather, that every shift will participate, and the total involvement of all personnel on the shift is a function of what the scenario is.

Q. I also understand that, from among 23 on duty, operators on both Units 1 and 2, on the 11:00 p.m. to 7:00 a.m. on the March 27th to March 28th shift, ten of them had not participated in a drill in 1978. Do you know why that was?

A. No, I don't know. Again, I feel it is probably the same reasons.

One thing I would like to just qualify here, it's my opinion, and I think the way the emergency plan is developed, versus the emergency operating procedures, that the emergency plan and the drills associated with it are more developed toward the radiological aspects rather than the actual response to the plant. And as such, our plan or concerns with the plan is in the exercise of those individuals in the communications and the communications links and the equipment that would be involved in responding to the radiological situation at hand, rather than in a plant emergency, which really is covered through an entirely different training program and licensing of the operators.

I don't know if that helps to qualify some of those questions.

Q. Just for the record, let me make certain that you have no additional information to assist us with the reason why, as we understand it, only four of ten individuals normally assigned to Unit 2 for operation on the 11:00 p.m. to 7:00 a.m. shift, hadn't participated in any drill in 1978.

A. I know of no other information.

Q. Was there a person designated in the emergency plan who had the role of the person who was responsible for making sure that it was implemented when an emergency took place?

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A. There is no individual defined in the plan that would. I would assume that the type of individual you're talking about would be one who would take the plan out and go use it more as a checklist, are we doing this or that. There is nobody defined in the plan to specifically fill that function. However, we have in various drills in the past and on March 28th, have had an individual who specifically did that. In other words, took the plan out and started going down the various functions to make sure that there were people fulfilling each of the roles, and that they were at least in the process of conducting their business as required.

Q. Did you say there was somebody who filled that role on March 28th?

A. Yes.

Q. Who was that?

A. Joe Logan.

Q. During previous emergency drills, there was also someone who fulfilled that role?

A. Yes. This typically -- this is another item that is presented in the emergency director's training. And that individual can be anyone whom the emergency director chooses. It could be an engineer or even an operator an auxiliary operator.

And we have on many occasions that I can recall -- and I can't guarantee that it was 100 percent, but on many

occasions we have had an individual who is specifically assigned to do that by the emergency director.

Q. As you recall, when Mr. Miller made his announcement on the 28th when he arrived, did he specify Mr. Logan as the person who was to ensure that the emergency plan was implemented?

A. Yes, he did.

Q. Apart from drills, what kind of training in responding to emergencies takes place?

A. In accordance with our emergency plan, we have a training program that's defined, that indicates the various functions, emergency functions, and which individual is to be trained in each of those particular functions, what normal classification of individual gets each type of training, and that training was conducted in 1978. That portion of it is entirely classroom training, with some in the area of use of radiological equipment and health physics instrumentation. There is some hands-on training.

Q. Who conducted that training?

A. It is conducted by various people, depending upon the classification of the emergency group. I have conducted some, training department has conducted some.

Q. Is there a person who coordinates that classroom training?

A. Yes. Well, I am responsible for it. I had

Len Landry this year or 1978, designated to work with the training group to coordinate all of it and to ensure the documentation.

Q. So would it be fair that, pursuant to the emergency plan, you are the person who has the responsibility, although you may delegate it, for ensuring that both the classoom and the drill parts of training are carried out?

A. Yes.

Q. It is my understanding that attendance at critiques that occur subsequent to the drill is not mandatory, although it is encouraged; is that correct?

A. That's probably a good assessment, although my observations have been that those people involved in the drills are typically in attendance at the critiques, with few exceptions.

Q. Were you ever aware of any complaints by technicians within your department that they have not bee invited to critiques, and therefore didn't attend any?

A. No, I am not aware that there were concerns there.

Q. By what means was the availability of the critique and the encouragement to attend them made known?

A. At the end of each drill, in terminating a drill, an announcement is made indicating that the drill is in fact terminated and to return to normal operations; and then an announcement as to the time and place of the critique is

given.

Q. Is there any training other than what we have just discussed which is specifically oriented for the personnel who may be in the position to act as emergency director?

A. I don't believe so.

The only additional item I guess I could mention is that they are all senior reactor or hold senior reactor operator licenses, which provides them the other aspect of emergency training, that associated with the plant.

Q. Is an effort made to ensure that all persons who may be called upon to act as emergency director have had or been involved in a drill in which they acted as emergency director?

A. Yes, I believe that is one of the objectives that we have.

Q. During a typical annual drill, would you have more than one person acting as the emergency director?

A. No, not typically.

Q. Who was the emergency director during the main drill, if I may call it that, which you had had in 1978?

A. I don't recall.

Q. Would it be -- strike that.

As you understand it, were there as many as seven different emergency directors for the seven different drills in 1978?

A. I believe there were. And typically it is designed

that way. We have obviously -- we have more emergency directors than we have drills, and several individuals who have run them for two or three years would be the ones who would not run a drill on a given year. And I think in this past year, for instance, Mr. Floyd, Mr. Ross, were not involved as emergency director, since they have done it for several years.

Q. Are there records which would indicate who was the emergency director in the seven drills that took place in 1978?

A. That should be available, yes.

Q. Maybe in the training department?

A. I would believe so.

MR. DIENELT: I would like to request those records, if they exist.

Off the record.

(Discussion off the record.)

MR. DIENELT: Back on the record.

I am advised by my betters that those records have already been received, so I will withdraw the request.

BY MR. DIENELT:

Q. Do you know whether anybody who acted as emergency director during the response to the March 28 incident had not had the opportunity to act as emergency director in a drill?

A. I don't believe so. I think they have all had the training and the drills.

Q. Did there come a point in time when, as you understood it, the accident was over and recovery began?

A. There was no specific time. We evolved to it.

Q. Was there a specific event?

A. No. To qualify that, there was a specific point in time when we felt confident in the stability of the plant, but that didn't make the release stop. And that was a rather long-term gradual evolution from accident to recovery.

Q. Can you approximate or state a date by which you felt certain that the evolution from emergency to recovery had taken place -- or had completed, I should say?

A. I can only guess that about the first part of May, it was fairly evident that we were into a recovery mode. We were on long-term cooling. And what the specific date was, I don't recall.

Q. During emergency drills were various persons given an opportunity to act as the ECS director?

A. We have had several people act as ECS director, yes.

Q. Do you know whether, in response to the accident on March 28, there was anybody who acted as ECS director who had not played that role in a drill?

A. I can't be certain that Mike Janouski, who fulfilled that function for a very brief time at the very onset, has personally been involved in a drill. I know he has had the training, but other than that, I think everyone has been

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involved in the drill.

Q. At the time when you and Mr. Mulleavy were alternating 12-hour shifts, am I correct that someone else who was in the Unit 1 control room was regarded as ECS director?

A. That's correct.

Q. It's your understanding that all the persons who filled that role in that period had had an opportunity to play that role in a drill?

A. No, I don't feel that. As a matter of fact, I'm fairly certain that they have not; although I also think that the function was entirely different than what one would have seen during a drill.

Q. What is the event that marks the requirement for evacuation of nonessential personnel?

A. The event that marks the requirement --

Q. Is it the declaration of site emergency or site emergency or something?

A. Discretion of the emergency director.

Q. When, in response to the March 28th incident, was it determined to evacuate nonessential personnel?

A. Approximately 10:00 o'clock in the morning. I don't know the exact time.

Q. Do you know how long it took to evacuate them?

A. No, I don't. The nonessential personnel were -- had

been mustered for quite some time at holding points, and it was at that point that we recognized that there really was no need and that we had the observation center set up to accommodate all of the support people that we needed, and that they would be close enough at hand if we did need people.

Q. In the last answer, when you referred to "that point," do you mean 10:00 o'clock or whenever it was that the evacuation was actually ordered?

A. Yes.

Q. But your testimony was that the evacuees were all at the places where they were supposed to muster and they were ready to leave for some period prior to that?

A. Yes.

Q. And they went to their mustering points upon the declaration of a site emergency?

A. That's correct.

Q. Do you recall doing an off-site dose calculation at approximately 7:10 on the morning of March 28th?

A. I did not do any off-site dose calculations.

Q. Do you recall verifying one?

A. I recall verifying one. I recall looking at several during the morning.

Q. And specifically, do you recall one that was made by Mr. Crawford based on a reading of the dome monitor?

A. Yes, sir, I do.

Q. Do you remember verifying that one?

A. Yes, I do.

Q. Am I correct that Mr. Crawford's calculation was incorrect?

A. No, I think Mr. Crawford's calculation was correct.

Q. Was it based on an incorrect reading of the monitor?

A. No, I don't believe so.

Q. What was the calculation of the off-site dose he came up with?

A. Approximately 10 R per hour gamma at a location which was the center of the town of Goldsboro, which is on the west shore of the Susquehanna.

Q. And your understanding is that, based upon the information that he had, he correctly calculated a projected dose of 10 R per hour?

A. Yes.

Q. That would have been the basis for evacuating Goldsboro, isn't it

A. If it was based only on information we had available, yes.

Q. What did you do to verify it?

A. At the time -- and I know I have some concerns with the NUREG document 0600, in the timing, and I have gone back since the accident, because I recalled when that figure was given to me we already had monitors at the site boundary in

the direction of Goldsboro on the west shore of the island here that were reading zero, no detectible radiation whatsoever. Also, at that time our containment pressure was negligible and it may have been one pound.

The projection is based on 55 pounds of pressure and at twice the tech spec allowable leak rate. I understand that the NUREG document indicates that was made at 10 after 7:00. If one were to review the radiation monitoring system strip charts and assume that the numbers that Howie Crawford used to input to the calculations were correct, that he read the monitor correctly, the timing was more like 7:35 rather than 7:10.

And I believe that those numbers were accurate and were made -- the calculations were made about 7:35. And I recall having the information available from the fencepost monitor, if you will, prior to that calculation. And those first numbers were available around 7:25 to 7:30.

Q. Am I correct that when you saw Mr. Crawford's calculation, as you recall it, you already had monitoring data which tended fairly strongly to suggest that the 10 R per hour projection in Goldsboro couldn't possibly be right?

A. That is correct.

Q. Did you have any role in ordering a Pennsylvania State -- or requesting a Pennsylvania State Police helicopter to come to TMI and take a team to Goldsboro to verify what

you thought and hoped was the fact, which is that it did not have a 10 R per hour reading there?

A. Yes, I was involved in the determination for the need of a helicopter. I did not make the specific request.

Q. Do you know who did?

A. George Kunder made the request via the site protection officer. It might have been a sergeant, someone in the security force.

Q. Did the helicopter arrive?

A. The helicopter came in. I don't recall a time. I believe it was an hour later.

Q. To your knowledge, did a team go in the helicopter to Goldsboro and take a measurement?

A. I thought one did. I have been led to believe -- when we determined the need for the helicopter, we simultaneously sent a team in a car to drive around. But recognizing the time it takes to get there, we requested a helicopter. Which team got there first I don't know. I know the helicopter was available, because I subsequently used it for other things.

Q. What did you use it for?

A. We had an iodine reading in Goldsboro that was questionable. In fact, the iodine sample was taken in xenen, x-e-n-e-n, atmosphere, and I did not feel comfortable that the reading taken was accurate. The reading was low

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enough to provide me with many hours to evaluate it, and I requested that helicopter to take the sample to the State Bureau of Radiological Protection for them to analyze it in their laboratories, to get a good handle on the actual value.

Q. Did there come a time when someone reported back to you about an actual reading which had been made in Goldsboro after you requested that one be made by the team, either in the car or by the team in the helicopter?

A. Yes.

Q. What was the reading that came back?

A. No detectible levels. This also is the one that had the detectible level of iodine. Although the level was very low, it was detectible. And I felt -- I think we have subsequently shown that the equipment used to monitor, analyze for the iodine dose, needs time to warm up and stabilize, and it was a quick field measurement that gave us a few spurious counts, and we thought it to be iodine.

Q. Can you explain how Mr. Crawford could have made an accurate calculation of 10 R per hour as the expected level in Goldsboro when in fact there were no detectible levels?

A. I think that the single biggest factor in that particular item is that the dome monitor did not respond accurately. The projected levels are based on the dome monitor readings, plus some very conservative assumptions. Since we are trying to do, in defining the procedure for dose

projections, there are a lot of parameters which cannot be determined, so that conservative assumptions are made. And I feel, first of all, that the dome monitor overresponded significantly.

I feel, secondly, that the building pressure of one or two pounds versus the conservative assumption of 55 pounds would add to it; and, thirdly, an accident leak rate of twice that of an allowable tech spec release rate, considering the fact that we were a brand-new plant in a brand-new building and were pretty leak-tight, and had to infer their conservatism to the qualification.

But I think the dome monitor was the overwhelming problem.

MR. DIENELT: Off the record.

(Brief recess.)

BY MR. DIENELT:

Q. You indicated when you were discussing the possible presence of iodine in Goldsboro, I believe, that you felt that its presence might be due to a large release of xenon or mobile gases?

A. Potential, not necessarily large, but potential xenon, that would also be absorbed on the charcoal filter, which would interfere with the iodine analysis.

Q. At what point did you draw that conclusion or hypothesis?

A. I have known that for years.

Q In the specific context of this incident? Maybe what I'm asking you is, when did you get the reading with respect to iodine which --

A We obtained the reading at approximately 8:30 to 8:45, in that neighborhood. The reading itself was not a very high reading, if it was a real reading. It allowed for many, many hours for us to evaluate it before we would have to take any type of protective action.

As a matter of fact, I think it was in the matter of hundreds of hours before any protective action would be required. So I felt -- and I discussed it with the State Bureau of Radiological Protection, the fact that we ought to do a very thorough evaluation, get the charcoal cartridge and the sample analyzed at the state laboratories to determine if in fact we really did have iodine.

Q Apart from the helicopter that came from the state police in connection with the readings or the expected levels in Goldsboro, were you involved in any requests for other helicopters?

A I did not make any other requests for other helicopters, no.

Q Other helicopters were used in connection with the response?

A Yes.

Q Do you know where they were obtained?

A I don't know specifically. I have been led to believe that they were helicopters from a helicopter service in the Gettysburg area. I could be mistaken on that.

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Q Do you know who made the arrangements for them?

A I know I didn't but whoever did, it was one of the best things they did.

Q Were there any arrangement made, or plans for the use of helicopters developed prior to the accident?

A No, there were not, other than, of course, what we just mentioned. We had on many occasions discussed the potential for use for the state police helicopter in ferrying people to the west shore, but not for the use -- monitoring use, that we gave the helicopters later on.

Q Had you ever used helicopters in drills?

A We have not used them in emergency drills. No.

Q Were you involved in establishing any communications between the Unit 2 control room and the ECS, after the emergency was declared on March 28th?

A Establishing the communications?

Q Yes, opening the phone line.

A Yes, I guess I have to say yes, in that I -- once I arrived in the control room and assessed the situation, I called the ECS on the page and established a communications link with the -- with Joe DeMann at the time, in the emergency control room station.

Q You encountered no delays or problems in connection with establishing communication with the ECS?

A No.

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Q Were there any delays or problems as the day wore on, with ECS?

A No. I think in our experience on March 28th, we found communications to be easier than we had ever had them during the drills, because of the lack of normal traffic on the communications network and normal conducting of business.

Q Were there additions made to your knowledge to the communications system from the Unit 2 control room to respond to the incident?

A I assume that you're talking in the first day, first hours?

Q Yes, sir.

A The only additional communications that I can recall was that an additional radio link was set up between the control room and the observation center, specifically between the control room and Jack Herbein at the observation center.

Q At a time later than March 28th, were there additional phones or other additional communications equipment installed?

A Yes.

Q What was installed?

A We had several additional phone lines installed.

Q Why was it necessary to have the additional lines?

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A I feel that the major problem that we ran into was the desire for various organizations to maintain open phone lines. I think we had at least two NRC-dedicated lines. We had a B&W-dedicated line. We had various other dedicated lines, and it just completely drained all of our normal telephone lines from the control room. If we wanted to make normal calls, or even calls that were in support of the emergency response but not to one of the specific agencies, we had very limited phone capabilities.

Q I take it that you held the view, prior to the incident on March 28th, that the existing communications network would be sufficient to deal with any accident which you contemplated?

A Yes.

Q Would it be fair to say you didn't contemplate an accident of this magnitude?

A It would be fair to say I didn't comprehend an accident of this type. Magnitude is questionable.

Q Did you have any role in coordinating efforts by state and federal agencies in connection with off-site monitoring after March 28th?

A No, I did not.

Q You were aware that various agencies were engaged in that monitoring?

Q I was aware that some agencies were involved in

monitoring. It took several weeks before I was made aware of the full scope of the monitoring.

Q Do you know who, if anyone, was coordinating the effort, or collecting and coordinating the information that was being developed by the various agencies?

A I don't believe that there was a single individual or single organization that was collecting all data. I think that the individual organizations had their own data collection mechanisms. But for instance, all the information available from the DOE wasn't available to Met Ed personnel for days -- at least not to the people I was familiar with.

Q Was there a person or a job category -- it doesn't have to be by name -- who was designated by the emergency plan to attempt to collect or to coordinate all of the data that various persons might collect in their off-site monitoring efforts during an emergency?

A No. The emergency plan really is defined -- or it defines that the monitoring capability is handled entirely by Met Ed, and addresses itself to that situation, which is the most conservative approach. The most limited number of people available.

I don't think that the plan had ever thought to address the multitude of interested parties that were here to take the data, and I'm sure there is a lot of extremely good data

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obtained -- and the coordination of that was not addressed in the plan, and I don't think went off very well.

Q When you had communication with BRH, did you receive any results of monitoring, which BRH had as a result of its own monitoring, or as a result of information furnished it by other sources?

A No, I was not aware of any.

Q Were there any persons from the BRH or otherwise from the Commonwealth of Pennsylvania in the control room?

A Not on March 28th. Not in any permanent-type assignment during the entire evolution.

Q NRC persons were invited to the drills; is that correct?

A That is correct.

Q And they participated in the critiques?

A That is correct.

Q Was there a mechanism for taking corrective action or adjusting the emergency procedures which were followed in response to critiques that were made by NRC or by other persons?

A NRC -- to better explain their role, the NRC involved in our drills did not participate in the critique as individuals with comments, but rather to witness the critique and then subsequent to the critique would hold an interview that would be documented in an inspection report.

And inspection report responses are very well-defined.

Q Was Mr. Porter in a position of authority in the period beginning on March 28th?

A I would not define his position as one of authority. Mr. Porter is a certified health physicist and a consultant. He has been involved in emergency planning for various utilities, and I think he acted in the role of a consultant, but his advice was very highly regarded.

Q Am I correct that he and his company, Porter & Gertz, were consultants to Met Ed prior to March 28?

A Yes, they were.

Q What -- strike that.

Had he dealt directly with you prior to March 28?

A He has on many occasions, yes.

Q What kind of consulting role would he play?

A He played a variety of roles, one being emergency planning, another being environmental monitoring, another being in-plant Health Physics, and several other areas.

Q Were there any other consultants who were employed prior to March 28th in connection with the Health Physics program as frequently as was Mr. Porter?

A I would say no. He was our principal consultant. I don't recall using any other organization, but on rare occasions.

Q Just so I can be clear, you did testify earlier

that Mr. Porter acted for some period of time as the ECS director in the period after March 28th?

A To clarify that, Mr. Porter was in the ECS. I don't believe he was ever in the ECS, in charge -- solely in charge of the organization. But I believe he was providing guidance to some of the other individuals such as Len Landry and Bev Good, in helping them establish the routing of off-site monitoring.

Q Do you know whether he ever ordered or requested that any samples be taken by the Rad Chem techs?

A I'm sure he had direct input into the directing of sample --

Q You don't know which ones?

A No, I do not. I'm sure there were numerous samples.

Q Do you know whether he actually issued an order for someone to do it, or simply made requests or suggestions that it be done?

A I don't know that one could distinguish between the two on March 28th or 29th. I can't really answer that.

Q Did you give any instructions to anyone relating to Mr. Porter's authority to request or direct that sampling take place?

A No, I did not. Mr. Porter is fairly well known by most of the members of our staff, if not all.

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Q Would it be fair to say that he was a person who had sufficient respect that wherever he went during the response, if he made a suggestion or a request, people would tend to follow the suggestion or request based on his -- based on the respect they had for him rather than on any formal role they felt he had had?

A That is correct. I think that is a fair assessment.

Q I believe you have indicated in your earlier testimony that you felt it would have been desirable to have one individual exercising overall responsibility in the Health Physics area in responding to the accident, in that there was no one to fill that role. Is that a fair statement?

A I think that the feeling -- or what I was trying to convey was that there -- I didn't feel that there was an adequate definition of areas of responsibility in the Health Physics area for the support of those that were inside. I feel that the organization is fairly well-defined and there is no question of the responsibilities and the chain of command in the Health Physics, for those of us who were inside, but that many of the functions of Health Physics are not going to be performed by those that are responding to the emergency. And especially in areas such as the logistics and supply, manning, coordination of schedules and

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things of that nature. And I feel that there ought to be not only a single individual responsible off-site, but several individuals who, reporting to that single individual, who have functional areas defined.

Q But you have made --

Would you have made Mr. Porter that individual if you had had the authority to do so?

A I don't know that I would have made him that individual, as much as I might have preferred to use his capability and expertise as one of the functional area managers, if you will, rather than overall coordinator.

I don't necessarily feel that that overall coordinator has got to be a health physicist. I feel that each of the functional areas has got to be somebody who is intimately familiar with Health Physics, but that an overall coordinator who is just a good manager would be sufficient, just to coordinate their activities and ensure that the right kind of person, be it a Syd Porter or health physicist from Peach Bottom, or Susquehanna plant or whatever, be in each of the functional areas and is carrying out the functional area responsibilities.

Q Did you make the concern that you have just expressed known during the response to the accident?

A I don't think I recognized the problem during the resonse as anywhere near that which I recognized several

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weeks afterwards. I knew we were having problems off-site because I didn't feel I was getting the response I wanted, but I couldn't in any way define why that was happening. Many times it actually go to the point where we thought there were specific individuals that weren't functioning. It wasn't that as much as that those individuals didn't have the coordination to define for them -- to the point they could support.

Q During the response, you were confused as to who your boss was?

A No.

Q That was Gary Miller?

A That was Gary Miller.

Q I want to show you a document which has been marked as Exhibit 30-18, entitled General Review of the Health Physics Program at Three Mile Island Nuclear Station, dated March 20, 1979.

Are you familiar with that?

A Yes, I am.

Q When was the first time you saw it?

A I don't know the specific date, but I would guess it to be probably March 23, 24.

Q What was the context in which you saw it?

A It was given to me for review as the result of an audit that had been performed at the station.

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Q Who gave it to you?

A Dave Limroth.

Q Had you been interviewed by the authors of the report?

A Yes.

Q What period of time or length of time had you spent with them?

A I spent -- in a direct interview -- on the order of three to four hours. But over the course of one week's stay, I would think that that at least doubled, at least, if not tripled, in total time.

Q Did you review the report for Mr. Limroth?

A I reviewed the report after it was given to me, and also we had established a meeting, and I don't recall the exact date at which the meetings was going to be held. But we had a meeing set up amongst two or three of us to discuss this particular report in preparation for a meeting with the vice president. That first meeting was set up for March 28th at 10:30 and never did materialize.

Q Had you prepared anything in writing?

A In response to this? No, I had not.

Q Yes, sir. Had you prepared anything in writing in connection with the preparation of the review?

A In preparation?

Q Of the report, of the document.

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A No.

Q Can you recall what your reaction was when you first reviewed the report?

A Yes. It was of no surprise to me. The authors had provided us with an exit interview prior to leaving the site and before preparing the report, where they had described each of the items as they felt they would appear in writing. The particular items under which -- there are many, I think, and in general I agree with the majority of them. I have a few of them I take exception to, but those -- but I feel that those I take excpetion to are significant ones.

Q Who attended the exit interview?

A I don't remember all of the people, but Gary Miller was there, Dave Limroth was there. I was there, in attendance. I believe Jim Seelinger was there, and there may have been someone else. I don't recall.

Q Was Mr. Mulleavy there?

A I don't recall. I do not believe so.

Q Were there changes of any significant nature in the conclusions and recommendations made in the report, from those which were related to the group at the exit meeting?

A No.

Q Had the meeting which was scheduled for March 28th at 10:30 ever been held?

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A No, it was not.

Q Has there been any meeting or consideration by a group since March 28th of this report?

A No, not to my knowledge.

Q Has there ever been a meeting at which you were present, or consideration by any group of the major items which you believe were identified in the report?

A There has not been a formal meeting held with a group of individuals, although I feel that many of the items, significant items that are presented here, have in fact been -- some of the recommendations have been incorporated more as a result of the accident than as a result of this report.

And primarily because of the tremendous change in the overall program at Three Mile Island. A lot of these issues, I think, are going away very rapidly. Not that this report is the document that has caused those things.

Q Are you aware of any actions that were contemplated by the Met Ed as a result of the exit interview or the report prior to the accident on March 28th?

A No, I do not believe there was any action contemplated. As a matter of fact, the meeting that we had scheduled on March 28th was to prepare the supervisory department level a plan of attack, if you will, that we could present to the Vice President in conjunction with our

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discussing this.

In other words, a game plan to try to resolve many of these problems because we had no assurance that the Vice President was going to, first of all, agree with some of the findings, and secondly, agree with our method of solving some of those problems. And we wanted to put them out on the table right at the beginning and we weren't going to waste our time running down the wrong paths.

Q Who was scheduled to attend the meeting on March 28th?

A Dave Limroth, myself, Jim Mudge, M-u-d-g-e, who was the supervisor of the radiation safety and environmental engineer group of Reading, which was our off-site, our corporate Health Physics support.

Q Was Mr. Mulleavy scheduled to attend?

A I don't really know. I can't remember. I do know the three of us were involved.

Q Would it be fair to characterize your view of what was to take place in that meeting as a strategy session designed to attempt to choose the best way to get management to go along with changes that you wanted to make, at least some of which had been suggested in the report?

A Right. We were attempting to define the methods of implementing some of the recommendations and the type of recommendations that exist in this document, are not small

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items, specific type concerns, but rather some very general concerns that I felt would take a fairly lengthy amount of time to resolve. And as a matter of fact, some even involved possible contract negotiations with the union, things that could drag on for years, and I think my major concern was that we define the methods of resolving them, and got the blessing of upper management right at the beginning so we knew we weren't going to be spending a lot of time, and then be turned around by management and put into a different direction.

Q Did you expect opposition or resistance from your upper management?

A Generally, no. In some items, I felt that there was the potential for resistance.

Q Turning back to Exhibit 30-18, you indicated that there were a few items with which you took exception. Can you tell me what they are?

A Well, I can give you one specific. I don't know if I can give you all of them without a detailed review. The one had to do with the -- some of the technical concerns relative to the TLD readings over the previous several months. I don't -- didn't personally feel that the individual that made the comments had sufficient time to evaluate all of the data, and that it was more of an overview that indicated to him problems that I think he

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addressed in specifics that were not totally accurate. That would be one example.

Q Do you have any others in mind at this time?

A I don't right now.

Q You indicated that the exception you did have did not go to what you regarded as the major points, is that correct?

A That's correct.

Q What were the major points?

A I think the major points were, first of all, the chemistry, HP departments being a combined organization, both at the technician level and then the organizational concerns at a supervisory level. I think the item of the necessity for a single individual responsible for dosimetry, I think the definition, if you will, of a rad chem tech's job scope, and in that the rad chem techs, through the years, have evolved to fill functions that could be, should be filled by utility workers, clerical personnel, things of that nature, which were -- which was diluting the efforts of the technicians.

In the concern of how many technicians is enough, that the number of technicians is going to be -- you need, is going to be defined by the job scope as you define it for them.

And finally, it just slipped my mind, training. Training

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of the technicians and the lack thereof and the need or the -- I didn't think that the opposition was going to come in the form of -- or I didn't feel that the significant finding here was going to be objected to by management, but I was very concerned about the recommenation or implementation of the corrective action that I was trying to push for.

Q So what you're saying is that you anticipated management would have problems with the amount of money you wanted to spend on training?

A Well, no, I think the concern I had in most of these and most of these go back to the same single item, we were in a -- I felt we were in a very tight condition financially and this was being borne out by cuts in budget, cuts in personnel budget. And any time that we defined a problem area that has a recommended solution, that will result in additional personnel. It was a very difficult or hard spot with our management because of the problems that we had had in the last couple of years in personnel budgets.

Q. In this context, who is "we"?

A. We at Met Ed.

Q. Are there any other major points in the report that you recall?

A. I think I have covered them. I think that covers generally about all of the points.

Q. Were there major points of concern to you with respect to the health physics program which were not addressed by the report?

A. Well, I would say no, primarily because I think the report was general enough that it involved a lot of these general problems. Some of the specific areas which may not have been addressed would in fact solve themselves.

An example would be some of the technical concerns on the dosimetry would most adequately be covered by getting a single individual responsible who could focus on those areas. Whether that be a real problem or not is academic.

Q. Are you aware of other reports or audits similar to the report and audit or examination which took place in connection with Exhibit 3018, that were made prior to the date of Exhibit 3018?

A. I am aware of one such audit, which was done by Don Reppert of GPU Service Corporation in conjunction with Tom Potter of Pickard, Lowe & Garrick.

Q. What is that organization?

A. Pickard, Lowe & Garrick is a consulting firm out of Washington, D.C.

Q. Was it written in connection with that examination or audit?

A. Yes, it was.

Q. Did you have an opportunity to review that?

A. Yes, and quite some time ago. I'm going back now to a year or a year and a half.

Q. As best you can recall, how did the conclusions and recommendations of the Reppert report, if we may call it that, compare with those of the NUS report, which is Exhibit 3018?

A. Well, I think the Reppert audit was done for a completely different purpose and was focusing on a different area.

To give a little background, the Reppert review or audit was actually requested by the general office review board, who brought up questions at one of the meetings based on some problems that Oyster Creek had had, and that one of the major problems at Oyster Creek was the inadequacy of procedures. The Reppert and Potter review was asked to specifically look at that area, an area of procedures, rather than a general overview of the entire department.

I think that the findings would naturally be different, because they were looking at it from an entirely different aspect. If I recall properly, I think that the report was

a lot more favorable, but that it did touch on, although not as extensively as this report, it did touch on the same general types of concerns.

One of the major differences, though, I think, if we can look at it, was that I think the Reppert and Potter review was done at a time when we hadn't felt the impact of Unit 2, and therefore a lot of the problems that the NUS audit had determined or defined were not quite as obvious, because of the additional manpower being available to keep a lot of these concerns a lot more hidden.

So I think -- it is my opinion of the way this transpired, I don't think that the Reppert report in any way presented the issues as vividly as this report did. And I think the reasoning is as I have explained it.

Q. Do you recall whether there were any actions taken with respect to procedures or with respect to other matters as a result of the Reppert report?

A. I don't recall right now.

Q. Who would be in the best position to know whether any changes had been made as a result of the Reppert report?

A. Well, I probably would be that person. I unfortunately haven't looked at it recently. And trying to go from memory, I just couldn't do it.

Q. Would it be fair to say that there were no dramatic or significant changes made as a result of the Repport

report?

A. I think that is a fair assessment, yes.

Q. I believe you said that the conclusions and recommendations of the NUS report did not come as a surprise to you?

A. Oh, no.

Q. And was the only reason for that that you had had an exit interview?

A. No.

Q. You were aware prior to the exit interview and prior to the audit that some of the problems or deficiencies, if I may call them that, existed?

A. Yes, most identified in this audit were identified in the sequence that the two individuals that authored this report conducted interviews and tried to determine from an HP staff where the major concerns were with our supervision, as well as many technicians. And then simultaneously it started out as a two-man interview, and very rapidly went to a one-man interview; the other man out in the field, trying to substantiate some of the concerns, trying to witness for themselves whether or not our concerns were in fact real. And based on what they found, they either came back -- and I think I could pretty much say every one of these recommendations was in, was actually defined first by someone from my staff or myself.

The bulk of them were things that I had asked them to look into. They also looked into areas that they felt we had had concerns, and came back feeling that we were not accurate in our assessment, in that the symptom that we were seeing was probably a result of a cause other than what we thought it was, and it was defined as such in the report.

Q. Prior to the interviews with you and your staff, had you had discussions with members of your staff regarding problems in the health physics program?

A. Yes.

Q. Have those discussions gone back over a period of time of as long as several years?

A. Two years, maybe, yes.

Q. Had you, during that same two-year span, made known the concerns which you had or the concerns which your staff had to upper management?

A. I think a lot of our concerns were made known to upper management on the Island. The question of whether they have gone to highest management, I would say in most cases they had; not frequently from me, but via Gary Miller. I feel fairly certain that the majority, overwhelming majority of the concerns, have been brought to Gary Miller's attention.

Q. Have you ever expressed your concerns or those of your staff in writing?

A. Not all concerns expressed in one document. As a

matter of fact, I would say that it's probably the best assessment that some concerns were expressed individually in writing at various times, but not a specific --

Q. Individually by you?

A. Individually by me or by members of my staff to me, and then forwarded to me.

Q. Do you know or can you approximate the number of separate instances in which there was some written communication directly or indirectly to Mr. Miller expressing a concern with some aspect of the health physics program?

A. I don't think I can put a real number on it.

Q. Would it be as much as ten in the last two years?

A. Half a dozen, maybe six.

I also would like to mention that Gary Miller did frequently hold meetings with the departments where he would have a concerns meeting, if you will, where we could not only discuss personal type concerns, but also department problems, these types of problems, and they were discussed in those types of meetings.

Q. Were you sent -- when you sent or forwarded a written communication to Mr. Miller regarding the problems with the health physics program, did you retain a copy?

A. I probably have on most occasions.

Q. Did you place a copy in any file maintained at the company, as opposed to a personal file of yours?

A. No.

MR. DIENELT: Off the record.

(Discussion off the record.)

MR. DIENELT: On the record.

I would like to ask Mr. Dubiel, if you will, and if his counsel would agree, to examine his own file and to make available for our examination any written documents from him or which he forwarded to Mr. Miller in relating to concerns or problems in the health physics area for the period from March 28th, 1977, to March 28th, 1979.

BY MR. DIENELT:

Q. Did you ever receive back any written response to any of the individual concerns you made or relayed to Mr. Miller?

A. I can't say that I have or have not received individual written response. I feel that every issue that was presented was addressed, and we discussed and tried to formulate a game plan to work towards a resolution. I feel like at Gary Miller's level, I got very good response, in times not total agreement, but definitely it was a response. And we were attempting and have attempted to define methods of resolving, and some of those things that we defined we couldn't move on for various reasons, and probably the single biggest reason being the budget cuts that took away a lot of our resolutions.

Q. Were there any changes made during the two-year period up to March 28th, 1979, in the health physics program which you believe came as a result or partly as a result of the concerns that you or your staff expressed?

A. We -- I don't recall any specifics in the HP area. The HP interface with rad wastes was an area of concern which was addressed and we did get resolution on. I can't give you a specific answer strictly on the HP area.

Q. What was done in the rad wastes area?

A. The major concern we had there was the operations department responsibility in the area of rad waste and the lack of any responsibility of HP in rad waste, and that we felt there were a lot of health physics problems being created that we had to solve, but had no impact on in the front end. And as a result of -- after much going back and forth, we finally got the entire rad waste group to report to me directly, which brought them all under my direction and created an interface that was a lot stronger, and we put HP on the front end of the rad waste process.

Q. Are you aware of any documents which would reflect what changes or game plan you or Mr. Miller had resolved upon which subsequently were not able to be implemented as a result of budgetary consideration?

A. Well, the thing that sticks out most in my mind is that we had put in a personnel budget request to add

additional technicians -- would be the simplest one. And those technicians were approved and authorized and subsequently cut when we received a budget cut. And those documentations are more -- most in the form of personnel forms that were filled out and submitted to request additional authorization.

Q. Did you and Mr. Miller prepare a proposed budget?

A. We, as a station, prepare a proposed budget that Gary Miller is responsible for. Part of that budget is a personnel budget, and not only my concerns, but the concerns of all the other concerns on the Island are filtered in, and Gary Miller did provide that my concerns were a top priority. And in light of some of the other departments lacking manpower, I felt that showed an awful strong regard by Gary Miller for the health physics concerns.

Unfortunately, we all lost, everybody. So I was the last one to get cut. But it doesn't make much difference, really.

Q. The cuts were no deeper in terms of health physics than they were in, say, terms of operational?

A. No, and I think, as a classic example, a lack of machinists in the maintenance department was a critical item, and we had put the additional support in my department -- Gary Miller had put that as a higher priority than the machinists.

I think the cutting of the additional machinists cut deeply into the maintenance group.

(Brief recess.)

BY MR. DIENELT:

Q. Directing your attention to Exhibit 3018, the NUS report, and specifically to page 2-1, can you tell me if you agree with the statement made in the report that "The present organization at Three Mile Island precludes the adequate performance of some critical health physics functions, and the basic problem appears to be that the health physics organization has not been properly upgraded to meet current demands."

And I should say that I'm asking you with respect to all of these for your opinion as of March 27th and prior.

A. Okay. I, as the statement that you just read, I generally agree with that statement.

Q. Was the fact or your view that the present organization precludes adequate performance of some critical health physics functions made known by you to upper management prior to March 28th?

A. It was made known in the fact that we had requested additional personnel.

I would just like to qualify one item there, which is performance of some critical health physics functions is something that is subject to interpretation, and I felt that there were many functions that were required by either the Code of Federal Regulations or regulatory guides or by our

own procedures that we may not have been fully adequate in complying with, adequate to the sense that it was not the ultimate position we would like to be in, but that I didn't feel that we were in any way compromising the safety of the workers at the station.

I did feel, though, that it showed trends towards that ultimate end point if we continued to go in the direction we were going in.

Q. Had you and Mr. Miller recommended any changes prior to March 28 to resolve the problem indicated by this statement regarding the present organization?

A. We had again requested additional people. We were, in fact, at the time working on reorganization to try to become more efficient and put the right people in the right spots to conduct the day to day business.

But I would also like to state that this particular statement I think is a very general statement, which is brought out in additional statements further as we go through.

Q. Let me direct your attention to another statement on page 2-1, that "Health physics and chemistry functions are combined under one department at the top, split apart at the supervisor/foreman level, then recombined at the technician level. This organizational structure is generally ineffective and has resulted in serious problems at the technician level. The scope of work is so extensive that none of the technicians

are properly qualified to perform all of their assigned duties."

Do you agree with that statement?

A. Yes.

Q. Had the problem reflected by that statement been made known to upper management prior to the investigation or audit which led to this report?

A. This is one of the items that has been discussed in the past with station management, and in fact was being addressed, or, I should say, the game plan, so to speak, to work towards a solution had already been started, although it was not very far along at the time.

Q. What had been done?

A. We had begun to put together the justification and documentation we felt would be necessary to sell upper management on the idea of splitting. We had also begun to try to define the job functions of the two departments once they were split, put together the position descriptions that are required, to try to work towards how we would present such a split to the union, and define the classifications, all of which had to be approved by the union or a contract negotiation would have to be finalized.

Things such as, of course, dollars, salary, et cetera, we weren't concerning ourselves with. But the others we had begun to work on.

Q. Had you formulated a recommendation as to how you would propose to reorganize the department?

A. We had not put a formal proposal in. I feel that that was part of what would go in as the justification. In other words, a justification that would include a recommended split, how many would go into what area, and how they could be used in general.

Q. Has any change in the organizational structure taken place since March 28th?

A. No, it has not. But we are once again actively involved in working towards that conclusion.

Q. Are there any definite plans for a change?

A. There is definite plans to pursue it on my level. I don't know that upper management is fully aware of our desires. By "upper management," I mean up to the vice president level.

Q. Turning your attention to page 2-3, at the top of the page, and I will ask you if you agree with the statement that "Dubiel's time and attention are spread much too thin, just by the fact that all these people report directly to him."

A. I guess I can't disagree with that. I don't think anybody feels that they don't have enough work to do. I agreed with that statement at the time. I really -- I think that some of the solutions as defined here would alleviate a lot of the problems, although I don't think that one could

ever envision that fewer people reporting directly would make all of the issues go away and that I would have plenty of time to sit and think about everything that I had to do. I don't think --

Q. Had you made suggestions to upper management prior to the investigation or examination that led to this report regarding changes which could be made to give you more time to perform functions that you needed to perform?

A. Right. Basically, I would like to just mention one extenuating circumstance of this particular item, and this has been discussed between Gary Miller and myself quite often: the question of how many, of what kind of people and what organization, is required, is one that we recognized was almost impossible to resolve at the point we were at. Understanding that we had, first of all, gotten a single unit operational to the point where it was starting to stabilize, you could pretty much define the organization required to continually support Unit 1.

But at the time I felt, anyway, and I think most others felt, that Unit 1 was achieving some consistency and predictability, Unit 2 went into a startup program. Startup programs by nature are a tremendous workload and a tremendous drain on people.

We got into a situation where we were now stabilized on one side, but totally unstabilized by this new plant coming

along on the other end of the Island.

About the time Unit 2 got on line and we may have had a chance to start breathing, Unit 1 went into a refueling outage. So for the very first time, we had one operational and one refueling simultaneously. It was at this time that this audit was performed.

So I think it's recognized that it was probably the worst of times, and I think one of the reasons why a lot of the items are so vividly portrayed as being major problems, we weren't living like this for a long time. It had evolved and developed, I think, through the year 1978, as we went through the startup program in Unit 2, reaching a climax, I guess, in the later months, November and December of '78, and then picked up again during the refueling outage.

My discussions with Gary Miller in the hard spots that I had in trying to define whether we wanted to get to was, we couldn't really understand with what two units operating, with some predictability and consistency, would ever be like, and trying to focus on where we wanted to go to was virtually impossible during startup. And only from about January to the accident, March 28th, were we able to start seeing that kind of a picture.

But we saw the worst end of that picture and also had the least amount of time to try and define the problems, to accomplish the long-term objective of defining the right

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organization. So that was one of the real keys, I think, in that, in that the situation became quite difficult for me trying to do my job over the course of the year 1978, because the Unit 2 startup, and then in the first part of '79, with the refueling outage.

And I don't think that we were far enough along to even define where we wanted to go. I felt confident that Unit 1 was going to be critical on March 28th, and once we got Unit 1 commercial or critical and back on line, and Unit 2 on line, we would have a chance to start focusing on it, and I felt confident that we would work toward a reasonable resolution.

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Q Did you explain the problem or situation which you just described to me to the two individuals who prepared the NUS report?

A Yes, I think they are well aware of it. I also think that some of the items they presented here were items that I really was hoping that we would present. I think they were a little vivid in some of their descriptions, although not incorrect.

Q Directing your attention to a statement beginning on the bottom of page II-3, "Essentially, all tool, equipment, and respirator decontamination at TMI is physically performed by the health physics/chemistry technicians. This is the major cause of the inadequate technician staffing."

And then going over on page II-4, this statement: "A crew of personnel, such as utility workers, should be permanently assigned to health physics for the specific purpose of tool, equipment, and respirator decontamination."

Do you agree with those two statements?

A I agree with the first statement in that it was and it is a major drain on my manpower. The resolution is not necessarily the only resolution. It is a resolution.

We were actually working more towards a better method of decontaminating such as some of the freon units or reverse electroplating units that have been developed recently.

So, I think it was a combination of adding the people, adding the equipment. I don't necessarily agree that the proposed resolution is the right one. It may in fact have been.

Q Was the concern about the amount of time which was drained off by having the technicians engaged in the tool, equipment, and respirator contamination by the means that were available be made known to upper management prior to the conduct of the investigation that resulted in the report?

A I don't know that that specifically was addressed to upper management. The general problem of not having the utility-type labor available to health physics had been addressed.

There also was an area where we were -- first of all, I don't believe we were even staffed to the level that we were allowed in the utility department. Because of personnel changes and what not, the utility group being the lowest or entry-level group at the Island, and as an electrician may leave the company, a man is put into the apprentice job if he is qualified to take that position; and the group that's always impacted regardless of who leaves is utility itself. And as a result, the utility staffing was low.

We were working to fill that staffing, although I can say

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that the bureaucracy that had developed to refill a position resulted in significant time lags between creation of the hole and filling of the hole.

And when you compounded that with many openings, it seemed like we never were able to get up to our staffing. Therefore, for me to draw additional resources from the utility group was virtually impossible.

The other thing that I think was quite evident is that as in my previous statements, this particular audit came in during a refueling outage where tool and equipment contamination and subsequent decontamination is at an absolute maximum. And the need to turn it around it is at a maximum. It probably impacted most at the time -- I don't disagree that we needed the help there, and, as a matter of fact, we at this point have taken the specific steps to solve the problem, meaing today, in September. We are again working back to the point of working to fill that particular need.

Q How are you doing that?

A What we are trying to do is to get authorization to establish specific number of jobs that will be classified as utility worker jobs. But that they will be newly created jobs and assigned to combination of health physics and rad waste. And what we intend to do is to have enough positions to fill both areas and rotate the individuals based on

exposure consideration, because we have the same type of need in the rad waste area.

Q So, you want to expand the size of the staff?

A That is correct.

Q And consequently increase the budget?

A That is correct.

Q Are you optimistic that you will be able to do that?

A I think so.

Q Turning to page II-5, a statement under the title "Clerical Function" -- "Technicians are presently doing a great deal of work which should be done by clerks."

Going on, "This certainly reduces the time available for the technicians to perform the more technical work for which they are paid and supposedly qualified."

And continuing on, "Of possible equal importance to the above is the fact that the clerical work which is being performed by the technicians leaves much to be desired."

Do you agree with those statements?

A I agree with those statements.

Q Was the concern reflected in those statements made known to upper management prior to the investigation?

A I don't believe that th particular concern was made known to upper manage ent. But if I could, I would like to address this one in conjunction with another issue

which describes where the clerk was all this time, which is the issue involving dosimetry.

It may -- as a matter of fact, it is addressed on the next page, which is page II-6, at the very top, and further addressed in subsequent sections.

We did not have a dosimetrist. We did not have a single individual responsible for dosimetry; and as a result, almost all of the clerical functions involved in the dosimetry program and some of the supervisory functions were being handled by the single clerk that was assigned to the department.

I feel that the clerical functions of the department could be handled by a single clerk, and I think we have since the accident shown that that is in fact the case, provided she is not overburdened with dosimetry functions.

And the resolution, or, I should say, what was presented to management was not the need for more clerical support, but rather the need for a dosimetrist and dosimetry support.

Q Now, has that need been addressed since the accident?

A It has been addressed, and it has been satisfied.

Q By what means?

A We have an individual that we have hired who is a full-time dosimetry supervisor, and his only functions are in the area of dosimetry.

Q Directing your attention to page II-7, there is a passage at the bottom of the page which states, "Previous outages, Met Ed has reportedly brought in a sufficient number of rent-a-techs to adequately cover the scope of radiological work to be performed. The number for the last outage was about 25. For the current Unit 1 outage, however, only six rent-a-techs were provided for a comparable work scope. The result is that the on-the-job health physics coverage which is required for inexperienced workers and is normally performed by rent-a-techs is grossly inadequate."

Do you agree with that statement?

A Absolutely.

Q Continuing on to page II-8, the statement that "Auxiliary operators are neither trained nor qualified to serve as health physics technicians." Do you agree with that statement?

A I feel that is a misinterpretation by the office. We provide training of auxiliary operators above and beyond the training provided for the average worker, but by no means are they trained or qualified to the level of a health technician, and we do not use them as such.

Q In other words, they don't need that training? Is that what you are saying?

A They do not need the training to the level of a

health physics technician.

Q And your view is that they get the training that they need to perform the functions that they have?

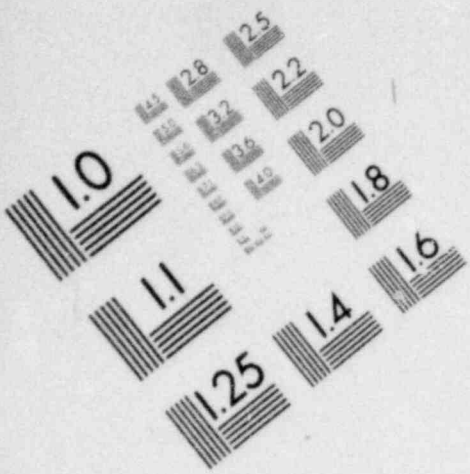
A Right. They had -- if I could just expound on this particular item -- this was a very, very sorry subject with us. Again, we budgeted for the Unit 1 refueling outage, I believe, a total of 23 rent-a-techs and had as a matter of fact even gone out and instructed nuclear support services to make arrangements to provide those 23 techs.

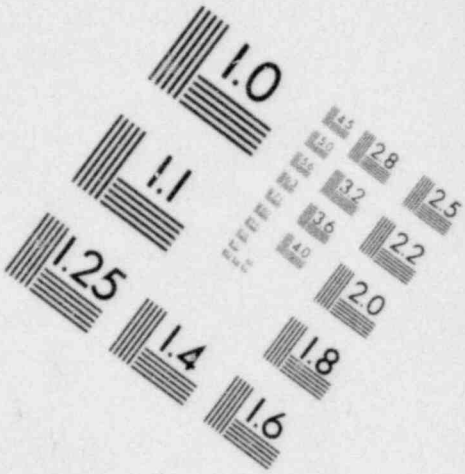
At the very last minute -- meaning as early as one week prior to the outage -- the outage budget was slashed, and, as a result, we were told that we would get no additional outside support. And I had to fight, and I got support from the people on site, but had to fight with management to get enough dollars just to bring in six technicians, which I thought was grossly inadequate. But it was a matter of either not spending dollars there or not doing some of the things that were -- expended the dollars for things that were required to be done by tech specs or corrective maintenance.

I feel like we really did come out on the short end of that, and I think the entire outage suffered because of it.

Q Who made the decision to cut the budget?

A I can't specifically address, although I can say that the original budget is -- and original plans for





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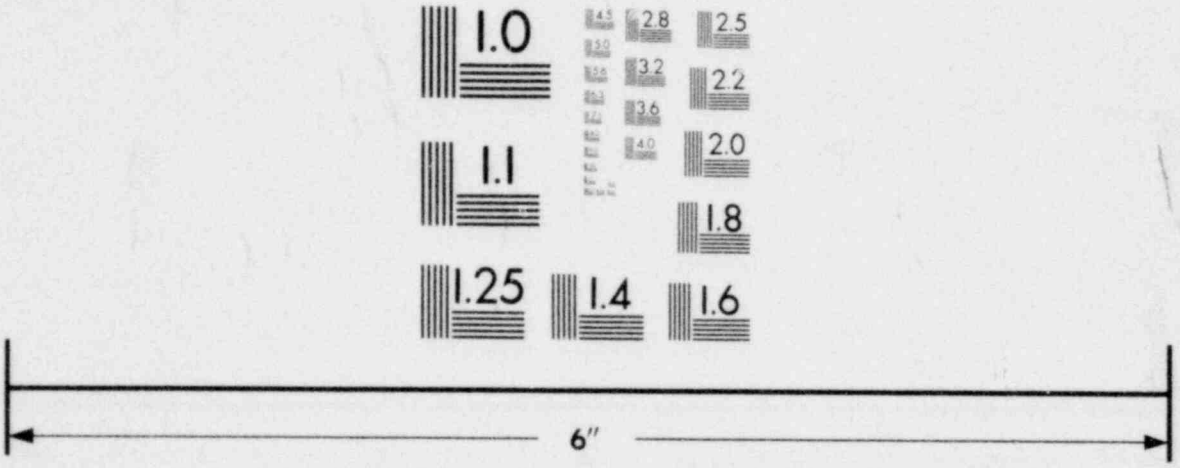

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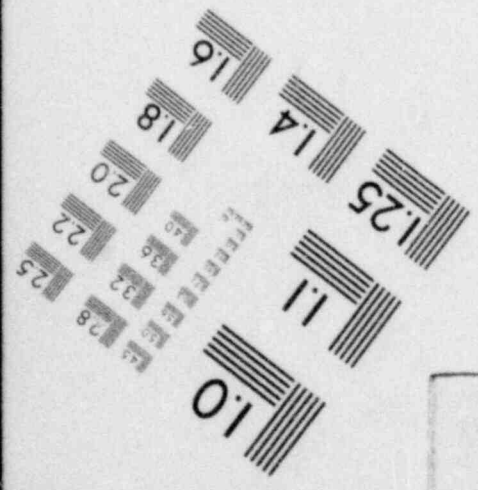

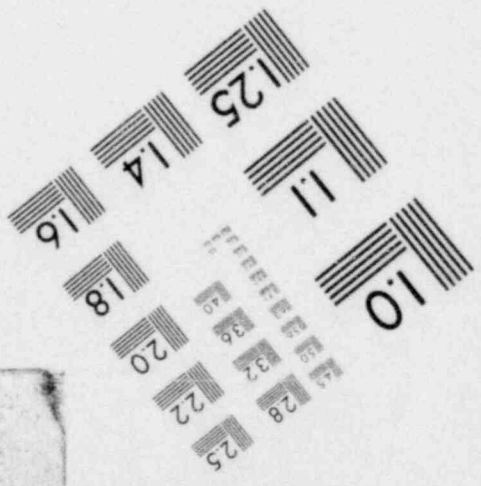

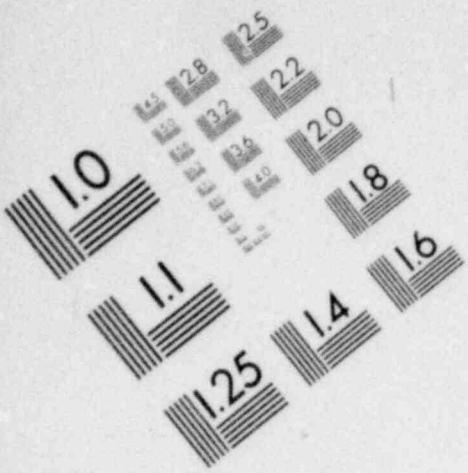

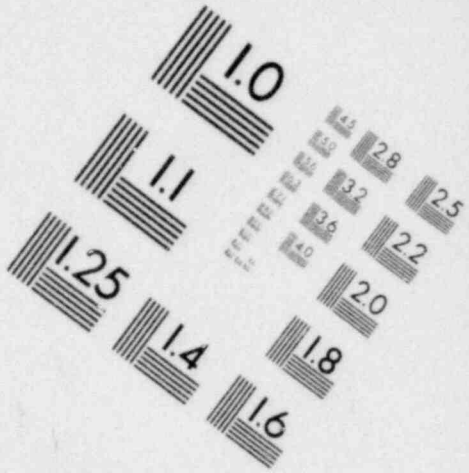

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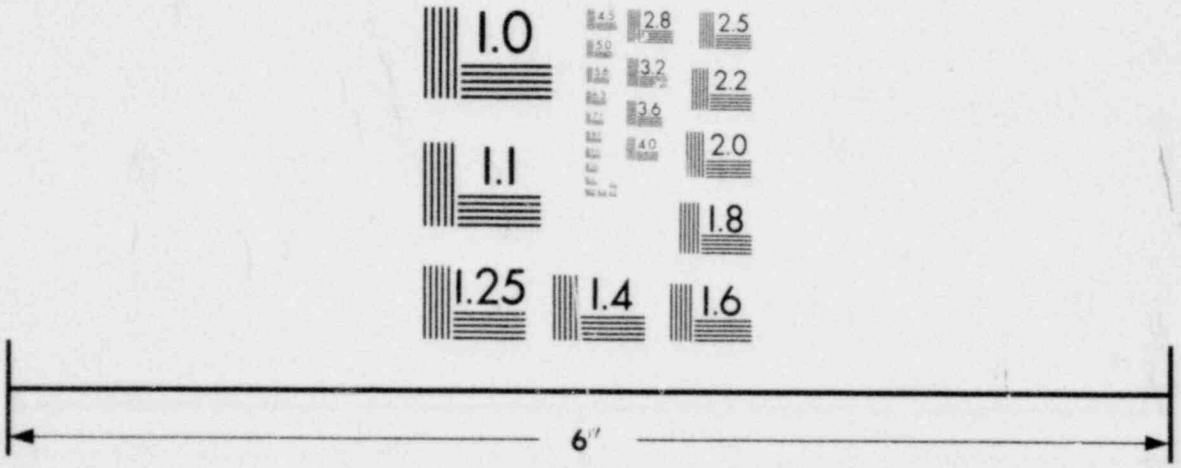

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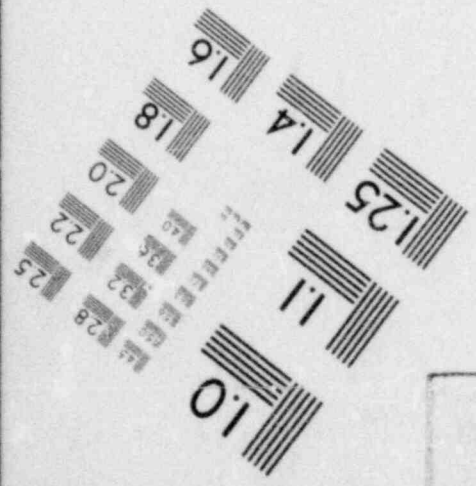

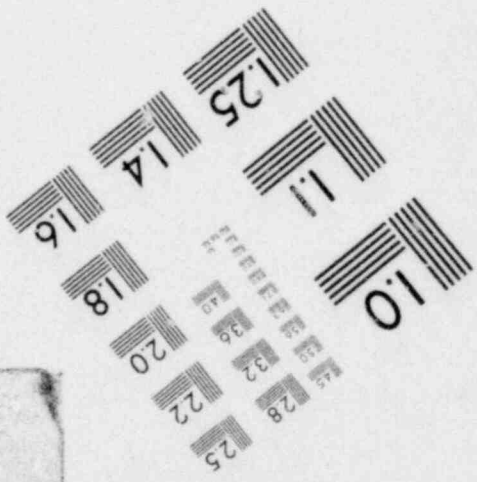

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outages -- are developed based on what has to be done. And it's more a matter of developing a budget based on what you're going to do rather than develop a budget and figure out what you're going to do.

But the budgeting that we had set up, I believe, considered the fact that we had anticipated rate relief long before the outage, and we did not get that relief. And therefore, the budget was seriously impacted.

And I would like to just mention, though, that that is my interpretation, and I sit a long way away from the financial people.

Q With whom did you discuss the concern about slashing the budget?

A Dave Limroth, Jim Seelinger, Gary Miller. And those were the people above me that I discussed it with, and, of course, Tom Mulleavy and others that worked for me were totally involved.

Q Is it your understanding that the budget cut was made by Met Ed, as opposed to GPU?

A I don't believe that to be totally accurate. I think they worked very much in conjunction in the area of finances.

Q Do you know how the decision was made to cut a portion of the budget such as health physics' portion in comparison to another portion of the budget?

A I don't know all the details other than the budget is fairly well defined as to where the anticipated dollars are going to go. And that when a budget is cut, it's a matter of defining how many dollars we have to sacrifice and then looking at how many areas we can in fact cut those dollars, viewing, of course, tech-spec required items as being a top priority.

Some costs are fixed, such as the cost of the fuel. The other areas of corrective maintenance have to be weighed for long-term plant performance availability, capacity, whatever, versus health physics.

I don't feel that we were singled out, by any means. I think all departments were seriously affected by the cuts.

Q Were you singled out in the budget for the outage?

A No, no, sir. I feel we were given fairly -- I feel, fairly high regard relative to the other groups. Unfortunately, there is a tremendous amount of cost in any -- either operating conditions or outage conditions -- that are fixed. And it is a very, very small percentage of the costs that is dollars that you can play with and dollars that you can eliminate.

Unfortunately, health physics is one of those dollars, if you wish to view it that way.

Q Did you believe that -- strike that.

In your view, were you able to cover the outage

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adequately with the reduced rate you had?

A I guess the question of what is "adequately" -- we managed to get throughout the outage without any overexposures, without any significant uptakes of radioactivity. I don't feel we offered professional support to the worker that would have minimized the exposure or minimized the potential for problems occurring.

I think we were lucky we did not have problems. In retrospect, I think our exposure levels were higher than what they should have been, our contamination incidents were higher than they should have been -- fortunately, none of them resulting or exceeding any legal limits.

I don't feel that that is adequate, though.

Q Do you believe that the strain, if I may call it that, which was placed on the health physics department to deal with the Unit 1 outage had any impact on its ability to deal with the emergency which began on March 28?

A From a manpower standpoint?

Q Yes, sir.

A I don't believe so. I think it definitely affected our long-term ability to respond to the post-accident situation, meaning through April, May, and June. Most of the people that we had on March 28 had come off of approximately five or six weeks of extended overtime. I don't feel that impacted us on March 28, 29,

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and 30, but into April it definitely did. I think all of our people were very tired by the end of April.

Q There was a loss of pocket chamber dosimeters during the Unit 1 outage?

A Yes.

Q In your view, did the fact that the staff you had with which to deal with the outage was reduced, contribute to the losses of the pocket chamber dosimeters?

A Yes. Absolutely. Typically, during an outage, because of the large number of workers that are going into the controlled area, we have a single individual to issue and collect and log exposures and maintain track of these pocket dosimeters. That was the first individual that was cut when I was reduced from 23 to six techs, because I didn't think that his impact was of significance in the safety standpoint, the radiological safety standpoint.

Q And there was also some damage to other instruments during the outage; wasn't there?

A There was. I don't know that I can specifically say that there was any increase in damage in this outage versus others. This outage, again, causes damage to the equipment because of the tremendous amount of use they get, portable instruments.

Q Returning to the budget question for a moment, do you know whether the distribution of the budget for an

outage is determined at the station management level, the
let ed level, the GPU level?

A I know that it was determined or a recommended distribution established at the station level. Final approval is by upper management. Whether that included GPU management or not, I don't know.

Q In connection with the outage, the recommendation inas far as health physics staffing that was made at the station management level was for a greater number?

A That is correct.

Q Is the same -- strike that.

Is the decisionmaking process which you have just described with respect to outage budget also applicable to the distribution for general operating budgets?

A That is correct.

Q Now, returning to the question of the training of auxiliary operators, are the auxiliary operators used in any health physics role during outages?

A They are used in a health physics role, but that particular role is of a, shall we say, a nontechnical, more clerical nature. For instance, any individual entering a reactor building has got to log in on an RWP and log out on an RWP, and the RWPs must be maintained and segregated, if you will. That function is given to an auxiliary operator during an outage. Picking up trash, contaminated trash.

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could be a job given to an auxiliary operator, things of that nature.

Q When the auxiliary operators are used in that capacity, do they also have operating responsibilities?

A No, sir.

Q So they report only to health physics during those situation?

A That is correct.

Q There is a statement on II-8 in the second full paragraph, that "dual reporting by these personnel to both health physics and operations has proved to be very ineffective." Was there dual reporting?

A There is dual reporting in that an operator on one day might report to operations and the next day to health physics, but in any given instance he has only a single reporting chain.

Q Has that kind of dual reporting created problems, in your view?

A I don't feel it has. I don't feel it has been a significant problem.

Q Turning to page III-1 of the NUS report, there is a statement that "There has been a decline in health physics credibility." Do you agree with that statement?

A I don't know that I can agree or disagree.

Q Do you feel that the credibility of the health

physics program was good prior to March 28?

A I don't know that there has been a change in it or I should say that the credibility has either increased or decreased over time. I don't think that it really has significantly changed, with the exception, I guess, of this year's refueling outage where, because of the lack of manning, there obviously was not the attention paid to the average worker that is normally paid.

If that is -- I don't think that -- I could interpret that as credibility. I personally feel that, with time, the individual TMI employee, non-health physics person, has developed considerably in the area of health physics through the years, just because of his increasing familiarity. And, if anything, I would think that we have developed closer ties with our workers.

Now, that might not in fact be true for the contracted maintenance worker that comes in only for an outage. I don't know that I could make a judgment there.

Q Is it your view that upper management views and treats health physics in the way that it should?

A I guess that depends on what you define as "how it should." Obviously, I am going to be a little bit subjective, being health physics- oriented, and in light of that, I would have to say "No." I don't think that health physics has been approached by upper management as I would

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have liked to see it approached, which is with a view toward the technical aspects and the technical detail.

It seems to have been approached as similar to any engineer function. In many cases, the management has tried to -- whether knowingly or unknowingly -- they have tried to dictate policies in HP, or health physics, that are more engineering-oriented, rather than technically oriented toward the safety aspects.

I don't think that there has been a tremendous disregard for health physics, by any means. I think they have recognized the importance, but I personally don't think that the individuals at upper management level have a significant understanding of health physics in the field.

Most of them -- I think health physics has changed dramatically over the last 10 or 15 years, and most of the individuals in upper management know health physics from the way it was in Yankee Row in 1964 or at Sexton plant in the '60s, which is so vastly different than it is today. Regulations have become so much more restrictive, and, I think, rightly so.

Q Two days ago, one of your foremen, Mr. Velez, indicated in his testimony that he thought that the management had too much of what he characterized as an "operations orientation rather than a health physics orientation." Would you agree with that characterization?

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A Yes, I would agree with that.

Q Yesterday, Mr. Mulleavy in his testimony said that, in his view, upper management, both before and after March 28, regarded health physics as a "necessary evil." Would you agree with that characterization?

A I think that is, with qualifications, that is a good statement.

Q What qualifications would you put on it?

A Well, first of all, I guess the thing that has to be recognized, what is an "evil"? Health physics is never -- has never made anything easier or a job go faster. You can obviously fix a valve or repair a pump or do an operation infinitely faster if you don't have to worry about any health physics aspects. Therefore, we can only slow things down or break even, at the very best.

It being an "evil," I don't think, is in the true sense of the word "evil," is an accurate description. It is necessary, and it does slow things down, and it does cost money, and you don't make any money because of that.

And therefore, if that defines an "evil," then, yes, I think that is a fair assessment.

Q As I recall it, Mr. Mulleavy went on to say that, in his view, the management was prepared to attempt to abide by the letter of federal regulations with respect to health physics matters, but no further.

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A They obviously were committed to abide by the letter of the law, the letter of the federal regulation. I don't feel that the support has been -- the support of health physics -- has been to the extent of pushing its radiological safety to the degree that most practicing health physicists would like to see it.

Whether it's "no further," I think I would probably take exception to that. I think that they were willing to do what could be done practicably and without undue cost or delay in schedules.

It took a tremendous amount to justify expending an additional funding or spending a day of down time, which was very expensive to do, in the interest of taking health physics a step further than the law.

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And I think in -- I can't say in all cases it was denied. We did in fact have delays for the sole purpose of HP, but I don't think it was to the extent that any one of us was satisfied totally.

Q I have gained the impression from the testimony of Messers. Janouski, Velez, and Mulleavy, that they believe, as I would put it, that health physics is something of a stepchild in comparison, let's say, to operations.

Would you agree with that characterization?

A I don't know that I know the definition of a "stepchild."

Q I will try in colloquial terms to put it to you: someone who is getting smaller portions, someone who is not treated as well.

A Yes, I think that is a fair assessment, understanding that operations are the moneymakers, so to speak. They're the ones who are going to keep the plant operating.

And not to go overboard on it, but I think we've got to all understand that this is a business and that if you can't keep the plant operating, then you can't make the money to keep the entire organization solvent.

Q Are there instances, in your view, when following health physics practices which you regard as good would save money?

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A I am sure there are. I am just trying to think of something specifically.

Q If, for example, you had been able to have your extra rent-a-tech during the last outage, do you think he would have paid his salary several times over in avoiding losses of pocket chambers?

A Yes, sir, that is an example that I should have thought of right away.

Q Continuing on, on page III-1, there is the statement that "The inadequacy in training of the health physics/chemistry technicians are readily apparent. When confronted by only slightly off-normal situations, they often lack sufficient understanding of their job to confidently take the appropriate action. The technicians also appear to have insufficient knowledge of the plant systems, including the radiological considerations that would apply if the system were operated."

Do you agree with that statement?

A In general, yes. Although I don't feel that the final statement -- "they appear to have insufficient knowledge of plant systems, including the radiological system would apply if the system were operated" -- is entirely true.

I think, in most cases, going back to the second sentence, we have operated under systems so many times that

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I think they by rote are very familiar with the radiological implications, and I don't think that we have been taking inappropriate actions in opening systems.

Q Would it be a fair characterization to say that what happened beginning on March 28 was an off-normal situation?

A I think that is a fair characterization.

Q Continuing on, on page III-1, there is the statement: "Understaffing has precluded any significant technician training for at least the past 11 years."

Do you agree with that?

A I agree with that as being one of the principal causes.

Q How long beyond 1-1/2 years, if any period of time, has understaffing been a principal reason why there has not been sufficient technician training?

A I wouldn't go beyond 1-1/2 years, primarily because the understaffing didn't occur until the impact of Unit 2 was felt.

Q Was the concern about the lack of training brought to the attention of upper management prior to this investigation?

A It has been presented. I don't feel it has been presented adequately. I don't think that enough attention has been placed higher. I think some of the other items we

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covered were getting the prime considerations both by myself and by upper management.

Q Why was that?

A Most probably because I felt the most urgent need, I guess, was in the other area, and whether that was a correct assessment or not is subject to debate.

Q Would it be fair to say that you believed that you needed to take care of operational health physics matters before you could turn your concerns to training?

A Yes. But I think that the major concern was, first of all, we had to get enough people such that we could afford to do the training, that we have the manpower without directly impacting the day-to-day operations of the HP organization, and then, most importantly, we had to figure out how we could train.

And I think the major concern that I have is that in the particular area of training, that those individuals on my staff that are responsible for the day-to-day operation of the HP group were also those individuals, the only individuals available to do any training and to take a first-line supervisor and to assign him -- first of all, a first-line supervisor that has more than enough to do to begin with, and assign him training responsibilities, which is a fairly time-consuming effort in its own right, and expect to get quality training is -- well, we are all

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kidding ourselves. And I have made that point quite vivid since the accident.

Q Going on to page III-2, there is a statement that: "The overriding of decisions made by health physics personnel has become a routine occurrence at TMI." Do you agree with that statement?

A I don't necessarily agree with that statement, no.

Q Are you saying that decisions were not overridden?

A Well, maybe I ought to qualify that. "Overriding of decisions." I don't think that there have been a significant number of decisions that were overridden, because those decisions were not technically correct.

What I feel has been a problem with several of our technicians is that the philosophy I have always tried to maintain, both myself through the supervisors and tried to get to the technicians, is that there is a right way and a wrong way to do something, but if the wrong way is being applied, that that doesn't mean that you just stop what's going on and walk away from it and bring everything to a screeching halt, but in some methods implement the correct way.

And it is a positive approach rather than negative approach, and I have had many occasions where I feel where the negative approach was taken: we can't do that, because the way they're doing is incorrect, and that's the end of

it.

And what I have tried to do is to force the situation where, "Yes, we are going to do the job. Now how can we do it right," as being the method. And I think a lot of people in our organization have taken that type of an approach by myself or by other supervisors as being a reversal of their decision.

I don't necessarily believe that to be the case. I think that most of the decisions that are made -- as a matter of fact, a tremendous number of decisions that are made on the technician level that are never questioned -- as a matter of fact, most of them are not brought to the attention of the supervisors, but quite frequently the most frequent type of action that is brought to my attention is that the job is stopped and everything is at a standstill and we are not getting anywhere.

Q Have situations been brought to your attention in which the health physics technician attempted to stop the job or change the way in which the job was done and the operations person just went ahead and did it the way he wanted to?

A I have had some occasions that that has happened. I think they are relatively few, and scattered over several years. I am sure there are occasions I don't know about, also.

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Q Are there occasions when a dispute between a health physics technician and an operational person as to how a particular job should be done, have been resolved by the shift foreman?

A I am sure there are.

Q The health physics technician on the backshift reports to the shift foreman; isn't that correct?

A He is responsible to the shift foreman; however, he is still responsible to the health physics organization to apply the health physics program.

Q Continuing on to page IV-1, the statement, "Activities which may involve considerable changes in radiological conditions are frequently conducted by operations personnel without notification to health physics." Is that true?

A I think that is true, with the qualification that the frequently -- we had several instances in the early operations of Unit 2. We also had several situations very similar in the early operation of Unit 1, that is more of a need to get the familiarization of the operators with their systems and how their systems can affect health physics.

At the time of this audit, Unit 2 was only commercial for about two months. And we were probably at the maximum. We had new operators; they were used to moving resin around, but the resin was never hot before. They were used to

moving liquid waste, but the liquid waste was never hot before. And we were at the point in the learning curve that we were having the most difficulty, and we were trying to focus on this particular problem.

Q You agree with the statement under 4.2 on page IV-1, that "Improper description of work to be performed on the radiation work permit has been a continuing problem"?

A Yes, I think it was. And that was a good statement at the time.

Q Are you aware of any instance of overexposure or contamination which have resulted from either the conduct of activities which may involve changes in the radiological conditions by operations personnel without notifying health physics or as a result of improper description of work to be performed under RWPs?

A I am aware of some contamination instances that have occurred, not to overexposures due to that problem.

Q In your view, would it have been likely that the instances of contamination would have not occurred or would have been less likely to occur if there had been proper advice to the health physics department or in a proper description of the work to be done on the RWP?

A Absolutely.

Q On page IV-2 at the bottom, the statement that, "There was a definite communications gap apparent between

radiation protection/chemistry supervisor and the health physics supervisor." Was that your view?

A I don't agree with that. In this particular case at the time of the audit, Tom Mulleavy and I spoke many times each day, and I personally have a hard time understanding how they -- or what the basis was for that statement.

Q Did you perceive a communications gap between the health physics supervisor and the health physics foremen or a gap between the foremen and the technicians?

A I perceived a gap that could exist. I could not specifically say that it did exist between the supervisor and the foremen, primarily because of the two-unit responsibilities, and that if Tom got wrapped in events going on in one unit, he might not be paying the appropriate attention to the other unit.

And on the foreman level, based on the six-shift rotation, the communications with personnel on the back shift is a difficult thing. Whether or not that communications gap existed, I really can't be specific in my opinion.

Q On page IV-3, there is a statement: "No effective methods employed to ensure that all the technicians are aware of procedure changes, although the problem is most prevalent for temporary-change notices, TCNs. It also

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applies to the actual procedure revisions."

Would you agree with that?

A I think that is a good assessment.

Q Was it your view that there are inadequacies in the health physics procedures?

A I don't believe there were significant inadequacies.

Q Would it be fair to say it was your view that whatever problems arose came not from the procedures as written, but from implementation of them?

A I'm not sure I quite understand the question.

Q If there were problems with respect to the health physics program at TMI, would you relate them to the procedures or the implementation of procedures?

A I would say it would be the implementation of the procedures, rather than the procedures.

Q Going on to page V-1, did you agree that the "Personnel dosimetry within the TMI health physics program was weak"?

A Yes.

Q Do you believe that the weakness has been solved by the hiring of a dosimetrist?

A I think that is taking a step in the right direction. I don't think I can truly evaluate whether it is a strong or weak area right now. I think we have come a

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long way. We have a long way to go.

Q Were there problems with the TLD reader?

A I don't think there were significant proolems with the reader.

Q Going over to VI-2, do you agree that "Both the frequency and location at which routine air samples were taken appear to be inadequate, were inadequate"?

A I would question the term -- the use of the term "inadequate." I think we had desires for improving our program, but I don't feel that the sampling that was being conducted was inadequate to prevent the significant problem, radiological problem, from occurring.

Q Finally, on page VI-3, there is a statement: "There appears to be no program at TMI for radio iodine sampling other than that provided by the iodine cartridges in the plenum, plenum continuous monitors." Is that a fair statement, a true statement?

A That was a true statement, with a few exceptions.

Q And what are they?

A We did take iodine samples in specific locations, but not as a general rule.

Q Did you have a plan in mind after you received and reviewed this report and prior to the scheduled meeting on March 28, for the changes which you felt should be made to improve the health physics program at TMI?

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A I had a basic plan.

Q What was that?

A Well, the first thing was to try and focus on the personnel aspects to try to determine the planning level, the job scope, try to provide the justification for additional people, splitting the department.

As a matter of fact, let me qualify that. The additional people we had already justified. It was just a question of getting the money for it. But to split the department, go for a dosimetrist, in areas that we -- where we had concerns outside of the personnel aspects, I was looking to trying to ensure that the dosimetry area, that we had someone to look specifically at the contentions. I had plans to have someone look at the air sampling program and to improve it, both from additional equipment as well as additional personnel, as part of the justification for additional personnel, and in the area -- as it spoke to communications, I think it was a matter of trying to look at the day-to-day routine operations of two units to try to determine the best method of proceeding for the assurance for the communications to flow down to each and every individual.

Some of the things that we looked at previously had already begun. We were holding periodic meetings with the technicians and things of that nature.

Q Were there any other items on your personal agenda

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for that change?

A I don't really recall. I think that pretty much is it. It was generally as I just said, the specifics.

I think one of the problems I have right now is I think I changed in some of the specifics since the accident, and I am looking at things far in excess of what I thought about at the time.

Q How many more personnel did you feel you needed?

A I felt that we needed a minimum of six additional people, provided we could in fact split the department, which I felt could increase the efficiency.

Q Then, in addition, you needed a dosimerist?

A That's right. I was not including a dosimetrist and possible clerical support for the dosimetrist.

Q Were any changes in the training program on the personal list of things you wanted to see made?

A In that particular area, I didn't have a defined game plan. I had an oobjective, which was to separate the training, the health physics training, from the health physics supervisors, to take the load off of them. I didn't know how I was go get to that objective.

Q Did you have as an objective improvement of the health physics training of the health physics personnel?

A Yes.

Q Was a need for more instrumentation, whether

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personnel dosimetry or survey instruments, on your list?

A No.

Q You thought you had adequate instruments?

A Yes.

Q After March 28, you indicated that your list had changed. How has it changed?

A Well, first of all, we are in a whole different world right now, following the accident. In some of the things I'm looking for is additional engineering support in health physics for an ALARA consideration. I am looking for a full-fledged defined ALARA program, which I think in our cause has got to be a lot more extensive than most plants because of the unique problems associated with Unit 2.

I had a fairly substantial air sampling program being implemented; and as a result of that program, which is requiring a significant number of new types of instruments -- air samplers, on-line analyzers, and laboratory equipment -- I have started thinking in terms of a health physics instrumentation support facility that could do both calibrations and repairs of all types of HP equipment, both laboratory equipment and portable instrumentation, air sampling equipment, and things of that nature.

We have had that since the accident, but we have had that based on a contractor coming in and doing it for us. I am looking to establish that as an integral part of the health

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physics program.

Prior to the accident, I didn't think in terms such as that. We are at the point right now that we are even looking in terms of an administrative assistant for the HP department. Whether or not we are able to justify that is a good question.

Q Any other changes as a result of the March 28th accident?

A Not significant changes. I think that I have been able to define the mechanism of reaching my objective of having the HP personnel in the training department to do the -- that training. We seem to have been able to come a long way in that particular regard.

Q Since March 28, I understand there is a full-time dosimetrist?

A That's correct.

Q What other changes have been implemented or are in the process of being implemented in the health physics area?

A Well, I have spoken with the instrumentation where we have a contractor on site taking sole responsibility for that entire area, including calibration and repair.

Most of the other items in the area of personnel, we have not acted on in that we have been kind of on hold in the area of personnel since Mar 28, up until approximately the first of September.

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We -- I don't think that there are other significant changes that are dictated by the tremendous number of rent-a-techs that we have now because of the Unit 2 situation and things o that nature. I can't say that the changes that I have seen I would consider to be long-term changes, other than, of course, the ones that we have mentioned -- dosimetrists, the intrumentation.

We are in the process to trying to define changes that have been made, as we can visualize as being long-term permenant-type situations.

Q Who initiated the changes that were made?

A Well, I don't know who initiated the dosimetrist. I think myself, Gary Miller, Jack Herbein all had a hand in that. I don't think any one specific person can take the credit for it.

Q Would it be fair to say that the impetus for change is from you and Mr. Miller rather than from upper management?

A No. I would say that upper management, first of all, is much more acutely aware of health physics problems on site, and that we have a much more direct and direct method of communicating with upper management. We hold HP meetings on a weekly basis. A lot of the concerns can be brought up as resolutions to existing problems, and they're being acted on much more readily and quickly at the

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management -- they are very receptive to changes that we can show justification that the change will improve conditions.

Q This is after the accident?

A That's correct.

Q Have you concluded as a result of the accident that you did not have sufficient instrumentation to deal with it?

A Add one word: I did not have sufficient instrumentation available. I had plenty of instruments on the site. I had an overwhelming majority of those instruments which were in need of repair. If all instruments that were in our inventory were available, I think we would have had adequate numbers.

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Q Is it your view that if you had not just gone through an outage, you would have had available a sufficient number of instruments?

A I think we probably would have been sufficiently instrumented to support the initial event. Obviously during the first two or three days of the event, we contaminated a lot of instruments. We broke a lot of instruments. And I would never -- there is no such thing as an adequate number of available on-site for a long term type program if you have the time to bring in the resources.

Q Were you of the view prior to March 28 that instruments which were down for repair were ordinarily repaired in a timely manner?

A Timely? I would say no. It took a significant amount of time to get any instrument repaired, much more than what you would consider to be timely fashion. But I don't feel that the lack of timeliness of repair was an impact on our day to day operations, prior to the accident up until of course the end of the outage where it definitely did impact us. And I may be somewhat misled by the fact that Unit 2 was a brand new plant with a lot of new equipment that had not been -- had a significant amount of use and, as a matter of fact, during the Unit 1 outage, we took a lot of that equipment into Unit 1 just to get us through the Unit 1 outage.

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Q Did you ever issue waivers to permit persons to enter areas without prescribed instruments because the instruments were not available?

A No.

Q What was the reason, as you understood it, for the delay or the lack of timeliness of repair of instruments?

A My opinion of the reason for the delay is that the instruments in the control shop -- the I&C shop has responsibility or had the responsibility for the repair of instrumentation. The I&C shop also has responsibility to maintain and repair other things such as the reactor protection system, the integrated control system, other significantly important I&C items in the plant. And as the -- during the outage, they had a significant amount of work in those high priorty type items, and we on several occasions had gone to them to try to increase the priority of our instrumentation, and we couldn't get that priority raised. And we were, as a matter of fact, told that until the time that the lack of HP instrumentation starts stopping work, we wouldn't get the priority raised because of the outage schedules and jobs that had to be performed by I&C.

I relate directly to the situation that I'm trying to get to where you have a separate organization that is hopefully under the control of HP, but that is separate from the I&C shop whose sole purpose is to take care of the health

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physics instrumentation.

Q Prior to March 28, did you believe that you had a health physics program through which you were able to ensure adequate radiological protection to the personnel at TMI?

A I would say, in general, yes. I was not satisfied that it was to the extent that I would like to have seen the program. I was also not satisfied in the trend. I think we were getting worse with time rather than better with time.

Q Why is that?

A I think all of the factors presented in this audit report of NUS can kind of in total brought to arrears the reason for that. The other thing is that some people are aware of the five year syndrome, as it's commonly referred to in a nuclear plant, that a lot of the original training of personnel has worn off, and you are getting at the point -- to the point where people aren't able to recall or rely on what they had been trained in.

Up until about five years, people do have the ability to recall. I think we were reaching that point with a lot of our technicians or older technicians.

Q Did you feel during the accident that adequate radiological protection was being provided to TMI personnel?

A I felt that the control that we had was adequate to protect the individuals from any significant radiological exposure. I sure do feel that it was the best job that

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anyone could have done. I don't feel it was the worst. I didn't feel -- I didn't have any concerns with people -- I hate to use the word "harmed", but medically affected by the situation at hand.

Q After the accident was over when you had an opportunity to reflect on the accident, did you conclude or do you believe that adequate radiological protection was, in fact, produced to TMI personnel during the accident?

A In the situation as I have described it, considering the immediate danger to personnel, I would say yes.

Considering the ability to maintain exposures within federal guidelines which are extremely restricted -- not restrictive, but conservative, relative to a medical concern, I would say no. But I feel there is a fairly large gap between the two levels that I'm talking about.

Q And this conclusion would apply to all individuals who are at TMI, involved in responding to the accident, rather than only those whom you were aware were entering high radiation areas?

A Yes, I believe that to be the case because I don't think you can sit back and rely -- or that you can ignore the fact that a lot of these individuals had had significant radiological training and, as in any safety situation, the individuals are the best means of defense. And I think most

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of these individuals knew what they were doing and had at least enough of a handle on how to conduct themselves to keep the potential at an absolute minimum of any significant medical impact.

MS. RIDGEWAY: Are we going to be going on long enough that we should take a short break?

MR. DIENELT: Off the record.

(brief recess.)

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EVENING SESSION

(5:00 p.m.)

Thereupon,

RICHARD DUBIEL

was called as a witness and, having been previously duly sworn, was examined and testified further as follows:

BY MR. DIENELT:

Q Was the adequacy of the radiation program affected in your view by any rush or urgency to get Unit 2 to full power?

A Directly, no. I don't feel it was affected. I feel is was indirectly affected and possibly to qualify that, I don't know that there really was a rush to get Unit 2 on-line at the end of the year as much as there was a rush to get Unit 2 on-line, regardless of when it came on, because of the financial situation.

And not being a financial expert and not being closely associated with them, I'm going on the information available to me. But it just makes sense to me that with the capital expense and the delays in the construction and the delays in the licensing I felt we were being impacted in the budget area. We weren't getting the rate relief. We were having a tough time making do with what we had and no chance to improve ourselves until we could get out of that situation.

And I didn't recognize that there would be an end to

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that situation until we could get Unit 2 on the line and the benefits of the second unit, the rate relief, et cetera, to provide for -- to open up a little bit on the financial situation -- the company.

Now whether or not the end of the year had any direct impact or not on the overall financial impact, I really don't know. I was led to believe that it did not.

Q I'm not as much concerned with the period of time or the end of the year or whatever. I just want to know if directly or indirectly, and if so, how the urgency -- if there was urgency to get Unit 2 into operation -- affected the health physics program.

A And again, I think that the indirect effect was through the budget restrictions that I felt affected Unit 1 more than Unit 2, but it did have some effect on the HP program.

Q How frequently were instruments calibrated?

A It varied with the instrument, but the majority of them were quarterly calibration.

Q In your view, was that adequate?

A That is in conjunction with the manufacturers' recommendations. I think historically we have seen that that was an adequate program, understanding of course that as a matter of fact all instruments are checked almost on a daily basis when in use.

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Q Were there instances in which you ran over calibration because there was a lack of instrumentation?

A No.

Q Before we took our break, you indicated that you viewed the level or amount of exposure to which persons were exposed after March 28 as not being of particular concern, even though they may have been higher than the federal limits.

Is it your view that the federal limits are too high?

A No, sir. I don't feel that the federal limits are too high for a long term, continual operation. But rather, I was trying to put it in the perspective of an emergency response situation.

Q Prior to March 28, were you of the view that there were any design deficiencies in the plant which would affect the radiological response to an accident?

A I would have to say no, because for the most part our view of the plant design, facility design, had been with the previously established accident scenarios which really didn't include the type of scenario that we had on March 28.

So in that matter I would say that following the types of accidents that we were concerned with, I think the plans were adequately designed to provide for that radiological protection. But we obviously have learned that the list of scenarios was not complete.

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Q Was it your view that there were design deficiencies which affected the health physics or radiological program during normal times in an adverse way?

A There were some design deficiencies that made life tougher, made some areas -- or we saw the potential for some areas to have extremely high levels of radiation that we needed to have frequent occupancy in. We were taking steps to change that.

Q What were those?

A Well, an example would be that the Unit 2 spent resin transfer line to Unit 1 was very well designed on the Unit 2 side, properly shielded, penetrated into Unit 1 and went right through a stairway.

Prior to that line ever being used, we had to change modification, in effect, to put the -- to move the line and to properly shield it on the Unit 1 side.

The sample lines were another. The sample lines typically would not get extremely high level, but they would provide for an increase in level in an area that is commonly occupied and which should have been considered prior to construction.

We had concerns with the makeup valve alley, which was very well designed for normal operation but which was absolutely poorly designed for maintenance. We were looking at increasing the access to the areas so we could minimize

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transit time in getting into the valve alley, things of that nature.

We had designed and were taking action.

Q The problem with the sample line, I understand, was that although it was shielded in United 2, when it came out of Unit 2 into Unit 1 toward the sample room, it was not shielded?

A That's correct.

Q And you did perceive this as a problem?

A Yes.

Q Had this concern been brought up to upper management?

A Yes.

Q Were there any plans prior to March 28 to shield that sample line?

A We had begun the pipe work to start the engineering on the shielding. It would require engineering changes and then plant changes, all of which were capital expense, and we had gotten -- at least defined it in the capital projects list.

Q Do you know why it wasn't originally shielded?

A I don't know. I can only surmise that the interface between Unit 1 and Unit 2 was not only a wall, but it was also an interface between one architect engineer and another, and I think it is one of the items that just fell

through the cracks. When the difference in AEs was involved.

Q Do you know who they were?

A Burns and Roe were the architects isn Unit 2 and Gilbert Associates were the architect engineers in Unit 1.

Q Am I correct that there was a single sampling room for both Unit 1 and Unit 2?

A That's correct.

Q Did you regard that as a problem?

A I do regard it as a problem, based on the accident. Under normal operations -- and I think it would have been a situation where exposure would not have been maintained at a minimum, because you would be going into the same area twice as many times and the levels would be twice as high, considering two plants that were equal in primary coolant activity.

I think that could have been designed differently or better.

Q Where was the sample room in relation to the health physics lab in Unit 1?

A They are in adjoining spaces with the radio/chem lab as being kind of a separating room. Between the sampling room and the HP lab.

Q Was there a problem with the air radiation monitor in the sample room?

A Yes.

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Q What was that problem?

A It was inoperative.

Q For how long, prior to March 28?

A Several months.

Q Do you know why it was inoperative for that length of time?

A I do not know specifically. It would have been a parts problem.

Q What was the effect, if any, of the fact that it was not operative on your response to the transient?

A I don't think that there was any effect as far as the response to the transient.

Q Was there a ventilation problem in the sample room, particularly with the hood?

A We have had ventilation problems not with the hood itself, but with the way the three rooms were designed in that by design, the air flow should have been from the HP lab into the chem lab and from the chem lab into the sample room, and then each of the sample rooms should have been into the hoods, the principle being that the ventilation flow should always be from an area of low potential contamination to a higher level of potential contamination.

The ventilation systems are tough to maintain in a balanced condition, and we have on a couple of occasions been faced with the situation that the flow of air would be

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from the chem lab to the HP area.

Now at the face of the hood, it was still into the hood. And the only way we could correct that situation was to secure the supply fans into the chem lab and only be exhausting from it and, therefore, creating a negative pressure situation which corrected the direction of flow but decreased the volume of flow. So you're trading one for the other.

Q Did the hood have separate vents and filters?

A Yes.

Q Did the problem that you have just described contribute to the fact that the HP Unit 1 lab where the ECS was designed to be located had to be abandoned?

A Yes, I think it did.

Q Now how could that have been avoided?

A Well, first of all, I don't think under the circumstances of March 28 and 29 that any system design that was relying strictly on maintaining exhaust flow in one room, higher than exhaust flow in another, that is going to keep your air flow through a connecting door in the direction that you desire. I don't think that that kind of a system is every going to be adequate. I think there has got to be something more elaborate, even if it is something as simple as a separate airlock type arrangement -- not necessarily an airtight arrangement, but something, some

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intermediate area that you can maintain at a significantly higher pressure than either of the surrounding areas to absolutely force air and to also give you a third buffer zone.

I'm not a ventilation expert, but from what I have ever seen of relying on a single door and balancing ventilation flows to keep the flow in the right direction, I don't think that is an adequate technique. With the activity that we had, it is going to get out under that kind of a situation.

Q Did the problem contribute, in your view, to any increase in airborne activity in the Unit 1 control room which led to its having to be temporarily abandoned?

A Well, Unit 1 Control was not temporarily abandoned. People had to go into respirators, but the people stayed in the Control Room. I don't know that I can positively say that it was or was not a contributing factor. I don't think it was a contributing factor. I think that the airborne activity problems in the Control Room were a result of the stagnant weather conditions and our air intake tunnel at times being in the downwind direction of the release.

Q Were you ever informed that the air monitor in the sample room had been deliberately disabled because it was always alarming?

A I don't recall that.

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Q During the period beginning on March 28, did variation in plant instrumentation which was designed to measure radiation levels peg out?

A Yes.

Q Is it true that all the process instrumentation pegged out?

A Yes.

Q Did some of the area monitors peg out?

A I don't recall whether the -- any of the area monitors were pegged out.

Q Do you know whether the dome monitor was pegged?

A The dome monitor did not peg, no.

Q After the accident began and continuing up to the present, am I correct that it has been necessary to take samples from a variety of sources -- containment makeup tank, waste gas decay tanks?

Are there -- strike that.

Were these various areas designed in such a way that there were remote sampling means in order -- which were available to take samples?

A No, not in general. I don't think any of them specifically had the remote capability. There are some remote mechanisms such as valve operators, but for the most part, it's pretty much of a manual function in taking samples.

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Q In light of the accident, do you believe that the remote sampling means should be available?

A I don't know that I can say yes. I think it is something that should definitely be evaluated. For the individual sampling points, I think you could justify some easily, some more difficult, and some probably not justifiable, some definitely. I think they ought to be evaluated.

Q Were there any in particular which you feel definitely should have remote sampling means?

A The reactor coolant system is probably the key. Secondly, I think the containment system, to get both a gas sample and I would think -- the gas sample and the hydrogen analysis might be separated there. I think the hydrogen analysis is probably more important and is something that you want to do a lot more frequently than, say, a gas sampling and activity analysis.

Q Was there a separation between the -- or is there a separation between the ventilation systems for the auxiliary and fuel handling buildings for Unit 2?

A Yes.

Q Did the fact that respirators had to be used in the Unit 1 Control Room, in your view, affect the ability to respond to the accident?

A I don't believe so.

Q Were respirators used in the Unit 2 Control Room?

A Yes, they were.

Q Did use of the respirators affect the ability -- did the use of respirators in the Unit 2 Control Room affect the ability to respond to the accident?

A I don't believe so.

Q Is it your view that it would be preferable to have a means by which the control rooms could go on some type of isolation, so they would not have the need for respirators?

A It would be preferable not to have to go on to respirators. Whether that be done by isolation or by more thoroughly ability to evaluate the radiological hazard, I think, is something that has to be weighed one against the other.

Q Were there any occasions on which respirators were employed in the control rooms during drills?

A I don't recall that there were any.

Q Did the separation of the ventilation systems between the fuel handling building and the auxiliary building prevent the flow of air from the auxiliary building into the fuel handling building?

A I don't believe there is absolute separation between the two.

Q So there was a flow of air?

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A I'm sure there was some crossventilation between the two buildings. I don't think that the design is to absolutely separate the two buildings in the ventilation systems.

Q Was their a problem with the liquid rad waste storage capacity during the transient?

A There was a problem in that we had really little capacity available.

Q That was because of the Unit 1 outage?

A The primary factor was the Unit 1 outage in that the waste generated was significant. A secondary factor would be in our ability to adequately process the waste in a timely fashion.

Q What caused that?

A Being a little bit subjective, I guess the rad waste systems are somewhat outdated. It looks to me like that is a typical system of where very little concern is presented during the construction and design phase. Very little attention was given to rad waste. We have not had a very reliable system. It has been a high maintenance item, high failure rates, and comparing the equipment that we have versus some of the equipment that was available, it looks like we have the Model-T.

Q Were there any proolems in the response to the accident which were caused by awkward placement of valves?

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A Your question pertains to the ability to respond versus the radiological impact of the awkward placement?

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Q No. The radiological impact. What I have in mind is the -- whether there was any great exposure or greater risk of exposure to individuals in responding to the accident because they had to go down and manipulate a valve which was placed in an awkward location.

A Yes, there were instances where we definitely received a lot more exposure than we could have received had it been designed differently.

There is one particular instance that bothers me considerably and that is that a bypass valve around the make-up demineralizers has a remote operator, mechanical operator, which a reach rod arrangement. And the reach rod had separated from the valve handle such that the remote operation was impossible. And I think it could have been a significant exposure to get anyone in to open that valve if it needed to be open and by significant, I mean we probably would have expended over 100 rem to one individual trying to get the valve open if we had to have it open.

Q Had you been aware of this problem -- a potential problem prior to the accident?

A We had been aware of the problem of the design of the valve ally and this was specifically one of the valve alleys that I indicated we had already addressed and were in the process of providing a modification to allow access from the other end of the alley so that such that you could get to

sls-2

the valve in a matter of seconds than to crawl through all the other piping to get at it.

Q Had you addressed the concern that you expressed regarding the antiquity, if I may call it that, of the Rad waste system?

A Yes, we had.

Q With what response?

A We had defined a fairly extensive capital or list of capital projects that was to modify -- first of all modify our equipment in an attempt to improve its reliability, and secondly, to modify the piping arrangement to provide optimum flexibility of the Rad waste processing systems on the available liquid waste.

Q Had you concerned yourself with any problems regarding the amount of exposure an individual would get if he had to go and repair a leaky valve?

A Yes.

Q Can you tell me about that?

A Yes. This in pretty much the same manner, we discussed, and I am assuming that this is addressed to a normal operation rather than the accident type condition.

We had addressed that particular item to management even to the level of the GPU president even as we gave him a tour and showed him what we were faced with to try to receive the backing to modify some of the shield wall arrangements to

sls-3

provide access to these particular valves. And we were getting -- and had received, the support to m ify the arrangements.

We had not, in fact, made any modifications as of March 28th.

Q What form had the support taken?

A In other words, the support was in the form of an agreement that the task had to be completed, that the priority would be high enough to allow for a timely completion of the task and we were in the process at that time of conducting the engineering to define how we were going to modify it and then proceed to make the modifications.

Q You testified earlier that one of your objectives with respect to health-physics training was to get the training department to take over the health-physics training for non-health-physics personnel; is that correct?

A As far as for health-physics personnel?

Q Why, as you understand it, is training located in the health-physics department rather than in the training department?

A To the best of my knowledge and understanding, the training department was created because of the requirements for operator training and operator requalification in conjunction with the licensing program. It was not created to conduct any training in any other area. It has since, and by that I mean in the years of '74, '75, '76, it has grown to include the administration of training in other areas, but it has not

sls-4

staffed itself or not provided the personnel to actually conduct the training. But rather just to administrate and by that, I mean to schedule, to provide facilities for, to provide training, videotaping, et cetera, and to document training, not to actually conduct the training.

Q Are you the person who is primarily responsible for health-physics training in the plant?

A That is correct.

Q Do you regard the health-physics training, which is given to nonhealth-physics personnel, as being adequate?

A I think it was an adequate program both before the accident and since the accident.

Q Do you regard the training of health-physics personnel as being adequate?

A The continuing, ongoing retraining program, I think is inadequate.

Q By that, do I correctly infer that the initial training in your view is adequate?

A Yes.

Q What was the form of initial training?

A The initial training was entirely conducted by contracting personnel. We have defined the scope of the training. We have then contracted organizations to come in for six or seven week periods to actually conduct the training in accordance with our training outlines.

sls-5

Q For how long has this been the situation?

A This has been the situation since the commercial operation of Unit 1. Prior to the -- the initial group of technicians that was in place to support the start-up of Unit 1, was in place long enough prior to the start-up of Unit 1, but the training could be conducted by the first line supervisors since they had very little irst-line responsibilities at the time.

Since then, all initial training has been done by contractors.

Q Has it been more than one contractor?

A I don't believe so. I believe it is the same contractor used on several occasions.

Q Who is that?

A Rad Services.

Q Am I correct that if I were hired as a junior Rad chem tech, what would happen to me is that I would report for work and that someone from a consulting service would come in and give me six or seven weeks of training?

A That's basically correct.

Q And would that all be classroom training?

A No, sir.

Q How much classroom training would I get?

A Approximately 50 percent, maybe a little less.

Q And the rest of the time would be spent on observing

sls-6

or in the role of a trainee in the plant?

A The rest of the time would be with the instructor, out with the equipment actually performing tasks, out in the plant under his direction.

Q Have there been occasions on which you have concluded that someone is sufficiently qualified, that he doesn't need the program from Rad Services?

A We have not had -- recently have not had that situation. I am not sure whatever prior to my coming to the company -- I don't believe that the individuals who came in directly out of the Navy as senior technicians received as extensive a training program.

Q Do you supervise the contents of the training course?

A Yes.

Q Do you actually observe the training from time to time?

A I have observed training from this particular organization on a couple of occasions, primarily the first time they did it.

Q Are written examinations given during or at the end of the course?

A Yes.

Q Are records of the results of these examinations maintained?

A They are maintained in the training department, yes,

sls-7

sir.

Q Are the examinations themselves maintained?

A Yes, I feel very confident that they are.

Q Am I correct that training week is a misnomer?

A It has been a misnomer, yes.

Q For how long?

A It has been not used as a training week for, oh I would say two, two and a half years, with some exceptions.

We still -- during the Unit 2 start-up, we used the training crew in actual training, all that training wasn't as specific to health-physics as it was plant familiarization.

Q Was training week a union requirement?

A No.

Q Do you know how training week developed?

A Training week developed in that the operators requiring a certain amount of training, retraining, for their requalification examination, you cannot train operators while they are operating. You need to have them specifically away from the plant. And on a five shift rotation here, your fifth shift is a relief shift, filling in for vacationers, filling in for shift leave and I think of that nature, you have no reliance on their availability, and so therefore the shift rotation was created.

Q Is it your view that training week has not been effectively used because of budgetary considerations?

sls-8

A Indirectly, yes, I would say so. Again, I would like to add that the availability of trainers has also seriously affected that.

Q The lack of availability of instructors?

A Correct.

Q And that in turn is a budgetary matter?

A Indirectly, yes. Also, the function of not just of the budgetary problems, but of the lack of definition of two -- well, maybe I should say the definition about the first line supervisors are going to be the instructors, which I think is a poor way to conduct the training.

Q Was the origin of training week in the operations area?

A I believe so.

Q Then it was simply applied to HP personnel?

A I believe so. It was in effect when I arrived at TMI in 1974.

Q Is there any classroom requalification training?

A For health-physics technicians?

Q Yes.

A There is no classroom requalification requirements, no.

Q Are there any classroom refresher courses?

A There are non -- we have not conducted them in a formal matter.

Q Have you recommended that there be classroom courses?

A I am assuming you mean have I made that recommendation to upper management in the past?

Q Yes, sir.

A I don't think that I can say that recommendation has been made or was a major area of concern that I have addressed to upper management.

Q Do you believe that there should be classroom requalification training?

A I think there should be a combination of classroom and I separate laboratory training from classrooms, and laboratory requalification.

Q You would regard laboratory requalification as more important?

A No, the requalification, in my mind, is that after you have been initially qualified in both an academic and the practical, if you can separate them that way, the academic being the theoretical aspects of the field, presented in the classroom, versus the practical being the hands on use of the equipment, schools available. I think is requalification program. The tendency has got to be toward more and more academic classroom type, but it can't be entirely academic classroom type.

Q Are you aware of any current plans or consideration for implementation, requalification training?

A Yes, sir.

Q Can you tell me briefly about those?

A I have had discussions with the training organization, not specifically the training department on site, but the manager who is now put in charge of training is using primarily consultants to develop some of the training programs.

My major concern is to first of all develop a requalification program that is manageable, definitely the personnel needs, for the instructor level. Also, to ensure that the HP supervision is included in this ongoing qualification program at a higher level than the technicians. And to implement such a program. And the program is in the development stages right now and is really high in priority, but is slightly behind the operator requalification program as required by the NRC for start-up of Unit 1.

Q Prior to March 28th, were you aware of complaints made by personnel in the health-physics department that their training or retraining was not adequate?

A Yes, sir, I was.

Q Would it be fair to say that the view that the training was not adequate was held by all or virtually all of the personnel in the health-physics department?

A Yes, I think the majority of them did.

Q Were you aware of specific complaints by health-physics personnel regarding the lack of or inadequacy of

sls-11

training on SAM-II.

A I am aware of one such instance. It was brought to my attention. Individuals indicating that they had not had training, and I went to the individual responsible for that training who was Lex Landry and made sure that that particular crew was, in fact, trained.

I had been made aware of, after the accident, that there was another group that had, through an administrative error, been defined as having the training, but in fact did not, but it was not the same crew that I was aware of before the accident.

Q Do you believe that the requirements for health-physics personnel in terms of their initial qualifications are sufficiently high?

A Are you referring to TMI's requirement?

Q Yes, sir.

A I think that the TMI requirements are sufficiently high, yes.

Q Do you think that the NRC's requirements are sufficiently high?

A I don't know that the NRC requirements are as well defined as I would like to see them, and I would say that because of their vagueness and especially with the ANSI standard, that it does not allow it or it does not lend itself to the assurance.

SLS-12

Though the standards are more time and grade rather than a qualification.

Q What suggestions would you make to improve the standards?

A Well, I personally think that the certification for radiological protection technicians, whether it be an NRC conducted licensing type program or be it and probably something more easily available, is the health-physic's society move towards certifying radiation protection technicians, something of that nature. But I would like to see a qualification and something develop either within the NRC or the use of an agency.

Q Are any members of the staff of the health-physics department at TMI, including yourself, currently certified by the health-physics department?

A No, there is no one certified.

Q In normal times, how is personnel exposure control at TMI?

A Typically it is controlled by logging of pocket dosimeter readings on a daily basis. I should say on an entry basis, every entry into the controlled areas. Which is maintained for a one-week period. We control exposure to 300 millirems in a week without authorization from an HP supervisor. On a weekly basis the dosimeter logs are picked up and inputted into the computer and the computer printout is available usually by Tuesday of the week. Monday is the beginning of our week,

sls-13

usually by Tuesday a computer printout is available and allows for a historical record up to the beginning of the week and we just maintain the 300 per week as an administrative limit.

Q Was that system in effect during the response to the accident?

A It was in effect up until the morning of March the 28th. It was not in effect on March 28th, 29th, 30th. We put the system back into place sometime in the first part of April.

Q In what major respects was the system not followed?

A First of all we -- know way could we manage the pocket dosimeter data because of the volume. Also, we did not want to rely on the pocket dosimeter readings. We wanted to rely TLD readings. So, the system was checked to allow for daily reading of TLD's. And occasionally, more frequently, but on a case by case basis and those numbers were not significant.

Q How was the TLD data normally utilized?

A Normally the TLD, prior to the accident, the TLD data was not available until the end of the month. TLD's were collected, processed and inputted into the same computer that had been receiving all the pocket dosimeter data and the computer would automatically supersede all pocket dosimeter data that was in the same time frame, but the TLD data was available.

Q Were there any other respects of a significant nature in which the system were controlling personnel exposure, which was employed between March 28th and the early part of

sls-14

April, different from the system which was employed prior to March 28th?

A Well, first of all we didn't have the control points to ensure that we would get all the pocket dosimeter data. We also found the computer system which was designed for a monthly update by TLD, was not able to handle it. It became a fairly large administrative burden, one which we spent a tremendous number of man hours in responding to, to try and update the entire system, to try and handle both the volume of TLD data as well as the rapid turn-around time, and it took us several days to get there where we were confident that we were getting information that was adquate to ensure that we were staying within the legal limits. And I think probably the key factor, and it's not something that is to our benefit, but the key factor was that we ran out of the quarter and we were able to rezero every one on April 1st and be able to begin anew with a fresh system, and that made it a lot easier to begin the controlling. And I think in retrospect, we relied an awful lot on an individual's ability to track his own exposure.

Q Were there problems with TLD control or readouts during the emergency?

A There were problems, yes. Of an administrative nature.

Q Can you elaborate?

A I want to just separate the -- there were no

sls-15

problems relevant to the accuracy of the reading. It was well substantiated, the fact that the exposure that we had determined by the reading of TLD's, was in fact an accurate representation of what that TLD did receive based on standards and calibrations and equipment.

The problem was an administrative one of collecting the TLD's, reading the TLD's, getting the TLD's back to the individuals and getting the information onto the computer and the computer information to the individuals that needed that kind of data.

MR. DIENELT: Mr. Lynch has a very short question or two.

BY MR. LYNCH:

Q When we requested a copy of the dosimetry, TLD dosimetry from the first of the year until -- or for the first two quarters, we received a large printout in which the period of time between the 28th of March and say May, was missing for a considerable number of people.

Are you aware of this?

A No.

Q Do you have any idea why it might be?

A I don't know why it would be missing unless those individuals -- and I can only surmise, I don't think we have holes that are that large except that recognizing that there are a lot of contractors that belong, or I should say workers that

sls-16

belong to local trade unions that were employed on the island up until March 28th in the capacity of a worker in Unit 1's refueling outage on March 28th.

The number of those individuals decreased tremendously and sometime around maybe May 1st is the right date. But I think it would vary with individuals, those same contractors have started to be brought back in to work in Unit 2.

Q Wouldn't their TLD's had been read if they had left the site?

A Yes. And the end date would have been March 28th.

Q Are you aware of any problems where TLD's, during the critical first week, maybe the first three or four days of the accident, where the TLD's were not read, but reissued several times?

A I am not aware of that, no.

Q Have you reviewed the personal dosimeter records since the time of the accident?

A We have a group of individuals right now who are performing just that function. And what they are doing is that they are looking at the entire scope of the TLD issuance. In other words, the log that indicated who was issued what badge on what day, the fact that that badge was read prior to its ever being issued again, that the reading was in fact entered into the computer and is attributed to the right individual for the right time frame. And of the literally hundreds of

sls-17

thousands of bits of data that are available, that we feel fairly confident that we haven't lost any of the records, because they were well maintained and documented. It is just that they are in boxes that are fairly large. They are methodically progressing through all of the data, and we are finding holes in the data that we are correcting.

But to date, the holes are not what I would consider to be significant holes. The types of things that I am seeing is a particular badge issued to a certain individual which was read with zero exposure, but that exposure was never entered into the computer or that a badge was read and that the dates were not put in properly.

We had a computer system at the time that didn't lend itself to the multiple issuing of dosimeters.

Over the course of a couple of days, we have had to modify our computer program, recognize that the computer program was designed for the type of conditions that we expected -- that we did have and expected to always have at Three Mile Island, not the type of accident condition that we were involved in.

Some of those design checks and balances in the system lended itself to actually reversing dates on badge readings for individuals. And I have seen this on several occasions and we have been able to explain why it happened. The total exposure was correct. It was just that the dates of the exposure were reversed. Those are the types of holes that we

sls-18

are finding. I haven't been made aware by this group, and granted they haven't gone through the entire data bag yet, I have not been made aware of any significant exposures that are not accounted for in the system.

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Q Have you, the supervisor of radiation protection and chemistry, reviewed the exposures for the first two quarters of 1979?

A I have not reviewed every exposure. I have reviewed -- or a print-out thereof. We not only have the printouts, but can also get existing lists, which basically give us the -- by exposure level, and I have reviewed those.

If you have seen the form, it's just about all you can do to lift the form anymore. There is over 6500 individuals on it. I have not gone through every single one of them, no.

Q Okay. Are there any reports by this group that are investigating the TLDs available?

A Report --

Q You have indicated they have given you some reports.

A Those tapes of things are available in the form of the correction to it, and the documentation of the correction on a case-by-case basis. And these are, yes, they are available.

Q Are there any other reports, or will there be a report issued that will specify the problem that was encountered and the resolution of the problem?

A I cannot say that we anticipate making a single report. There is none available at this point in time. There may be, eventually.

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Q The TLD badge that you have --

A Yes, sir.

Q -- where was that designed?

A Harnaw Chemical Company.

Q Was the design specifically for TMI or is it a common badge?

A No, it is a commercially available badge.

Q Other plants use it?

A Yes.

Q Can the card inside, if you want to call it that, be placed in the badge holder in any way?

A There is basically two ways it can fit in, yes, and it is not in any way -- two ways.

Q Two ways? Two different ways?

A Yes.

Q If the card is misplaced in the badge, but read normally, can you get an abnormal reading of the badge?

A You can get an incorrect reading that effectively will be an overresponse than what you think is your gamma response, and an underresponse in what you think is the beta or you would not get a beta response.

Q Is there any way to detect such an incorrect reading of the badge in the system?

A Yes.

Q What is that?

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A If the readouts are reversed. The badge accepts both beta and gamma, versus the badge that accepts only gamma or penetrating radiation. The one that accepts both is always the higher of the two. And if the two are in reversed order, then the badge was obviously put in backwards. And by reverse order, within the accuracy, there is a plus or minus response on it that is a fairly narrow band, but if you see an overresponsive by a factor of two in the gamma chip to the beta/gamma chip, it is indicative that the badge was in backwards.

Q Does the system -- excuse me.

How would the system record an exposure of less than 10 millirem on the TLD?

A The system will not accept a reading of less than 10 millirem.

Q If badges are read every day, what would be the net over a period of 30 days?

A The net could be as much as 300 millirem.

BY MR. DIENELT:

Q Would it be fair to say that during the emergency beginning on March 28th, Health Physics procedures were relaxed?

A Yes.

Q Significantly relaxed?

A Yes.

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Q Was the reason for relaxation the nature of the emergency?

A I think so. And to kind of qualify that relaxation, the procedures are defined to tell you not only what to do, but also to put all of what you do down in writing, and I don't think that the procedural guidance on how to do things was relaxed as much as the documentation, the filling out of the forms, the getting of the documentation, the proper filing, et cetera -- that was relaxed.

Q Returning for a moment to the auxiliary building, was a log or any other record kept, to your knowledge, of any entries and exits from the auxiliary building?

A No, not during the accident.

Q Who, if anyone, as you understood it, had the responsibility to assert and exercise control over entry to and exit from the auxiliary building?

A I don't know that anybody had that specific responsibility. Unfortunately, the plan itself is designed to keep the radiation protection supervisor at the emergency control station with that type of control. Although, it's not explicitly designed in the plan, by virtue of its responsibilities there, he would in fact have responsibility. But due to the closing of the door between the two units, isolating the one unit from the other unit,

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makes access impossible. The entire accessibility to Unit 2 had to be changed.

Q You did not believe that it was your responsibility to assert that control?

A I did not take that responsibility. I do not think that I considered that during the initial days. Once the situation became a little bit more stable, we did, in fact, and I did, in fact, when I was on a shift, take that responsibility and control it.

Q And Mr. Mulleavy had the responsibility and took the responsibility and took the responsibility when he was on shift?

A That's correct.

Q Do you know whether the plan designates the ECS director as being responsible for staff control and entry in and the exit from —

A The plan does not establish that responsibility. It does establish the responsibility of the ECS director to monitor the activities of emergency repair party, which I think in a general sense would provide for that type of control.

Q Did it work that way?

A It did not work that way, because of the closing of the door between the two units.

Q When the doors were locked to the auxiliary

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building, who fixed the lock?

A The door is locked to the auxiliary building? No.

Q Were they locked?

A If you are referring to the door between the two units?

Q Yes. No -- excuse me.

Were the access doors to the auxiliary building locked?

A No. With some qualification on that. Some doors are normally locked, but there were access doors that were unlocked, and the two major access doors would be through the Health Physics lab and via the Unit 1/Unit 2 common door. That door was closed. Whether or not it was locked, I don't know, but we had that door shut. The other area was open.

Q Is it still open?

A It is still open, but it is controlled. We have people there 24 hours a day.

Q I just have one final question that may be somewhat lengthy. It goes back to a question I tried to ask earlier.

I'm getting the impression from the fact that there was not a rigorous control over entry into the auxiliary building and from the fact that there was some very high levels at some places in the auxiliary building, that on the

28th or 29th, someone could have walked into that building and because he tripped and fell or for some other reason, could have gotten seriously harmed, if not killed.

And I think that that is a concern that is very grave, and I'm sure you will agree with that and that anybody reading a report about this accident or looking into this accident must address. And I would just like for you to respond to that concern. I certainly don't want to have a situation in which anybody suggests that that was a realistic concern, if in fact it was not.

A Well, first of all I think that if I had a concern about harm to people, my major concern was somebody falling off a ladder with a Scott air pack and breaking his back when he fell, rather than from a radiological aspect.

I don't -- first of all, I don't feel that there was a concern about people wandering into the building. There weren't people on-site that weren't involved with the emergency that were very intimately familiar with the circumstances.

There were very few people on-site during the morning of the 28th, and right through the afternoon and into the 29th. The fact that single individuals could go in to the auxiliary building under an operation -- directions to perform an operation or something of that nature, and get hurt by, say, falling down stairs or falling off a ladder,

yes, there was a concern.

We made efforts to identify safety people. We made efforts to at least send two people in unless that operation that the individual is going to be performing was a very simple type thing and we and several of those where the individual only had to walk in the door, go straight down a passageway on the same level, with no tripping hazard, to a control panel and throw some switches and then turn around and come back out, that type of operation was allowed to progress with a single individual.

I don't know that I personally shared the concern of imminent danger to individuals as much as some have expressed. And maybe it was because of my not being aware at the time of some of the entries, but in light of what had to be done, and the people doing it, I didn't feel that we were that close.

There weren't a lot of jobs that had to be done, and positions that require people to go climbing up ladders and over things and where they could get themselves in that position. I think it is a concern, but the level of concern, I guess, is questionable.

Obviously, we should focus more on in-plant Health Physics and emergency planning. Obviously, that is an area that I think we have all overlooked for years because of our focus on the off-site health and safety of the public, more

than health and safety of a worker than a safety response. And I think there has to be an awful lot of attention put there, but I guess the best way to describe it is, I can only go back and view the circumstances in and the way I felt at the time. And I don't think I had that strong a concern for that type of an event.

And some of those areas where I did have concerns, we took steps to ensure that there was at least a safety man or the man was timed. The guy -- we knew he was going to have a two-minute job and we had a man available and ready to go in if he didn't show up.

MS. RIDGWAY: Off the record.

(Discussion off the record.)

THE WITNESS: Well, the only thing I guess I wanted to say was that I am not sure I made clear enough the idea of the unauthorized access or the casual observer wandering into the auxiliary building, and I would just like to stress the fact that from the very early onset, access to the entire island was very, very tightly controlled, and that the individuals that were on-site were intimately familiar with the fact that we had an emergency situation, that they had a specific assignment to locations and were directed to those locations, and subsequently directed from there.

So I felt confident that the people on-site were well

accounted for, either in control rooms or in the emergency control station, until it also became part of the control room.

BY MR. DIENELT:

Q When we were off the record, I asked you to look at a passage from the NUREG-0600 document which appears, beginning on page 2356 and is paragraph 3.2.4.8.

You did review that passage?

A Yes.

Q Prior to today, were you aware of the incident which is described in this passage?

A Yes, I was.

Q So it would be fair to say that in your last answers, you took into account the situation such as were described in that passage?

A Yes.

MR. DIENELT: You have been interviewed now on numerous occasions and you have been extremely patient and responsive, too, and I appreciate it.

And I am finished with my questioning, except that I would like to ask you if there is information which you have which has not been elicited by the interviews and depositions that you have given, not simply this one but the others, as well, which you believe would be of use to us in the inquiry.

If you do have that information, I would appreciate your telling me.

THE WITNESS: I don't have any specific information that I can think of at this point. If I come across any, I will be sure to let you — provide copies to you.

MR. DIENELT: Thank you very much. With that I will adjourn the deposition and I do not believe we will need to ask you to come back.

If for some reason we conclude that we do, we will notify you.

(Whereupon, at 12:25 p.m., the taking of the deposition was adjourned.)