UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the matter of:

METROPOLITAN EDISON COMPANY (Docket No. 50-289 (Restart)

(Three Mile Island Unit 1)

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25 North Court Street,
Harrisburg, Pennsylvania

Wednesday, February 4, 1981

Evidentiary hearing in the above-entitled matter was resumed, pursuant to adjournment, at 9:07 a.m.

BEFORE:

IVAN W. SMITH, Esq., Chairman,
Atomic Safety and Licensing Board

DR. WALTER H. JORDAN, Member

DR. LINDA W. LITTLE, Member

Also present on behalf of the Board:

MS. DORIS MORAN,
Clerk to the Board

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APPEARANCES:

On behalf of the Licensee, Metropolitan Edison Company:

GEORGE F. TROWBRIDGE, Esq.
ERNEST BLAKE, Esq.
Shaw, Pittman, Potts and Trowbridge,
1800 M Street, N.W.,
Washington, D. C.

On behalf of the Commonwealth of Pennsylvania:

ROBERT ADLER, Esq.
Assistant Attorney General,
505 Executive House,
Harrisburg, Pennsylvania
WILLIAM DORNSIFE,
Nuclear Engineer

On behalf of the Regulatory Staff:

JAMES TOURTELLOTTE, Esq.
DANIEL SWANSON, Esq.
Office of Executive Legal Director,
United States Nuclear Regulatory Commission,
Washington, D. C.

On behalf of ANGRY:
GAIL BRADFORD

On behalf of the Pennsylvania Utility Commission:

JOHN A. LEVIN, Esq.

C O N T E N T S

P R O C E E D I N G S

CHAIRMAN SMITH: There are no intervenors present. I guess we should proceed.

MR. ADLER: MR. Chairman, I spoke with Mr. Levin on the phone this morning and I would like to report on that conversation. Mr. Levin was vaguely familiar with the Theodore Barry report. However, he declined it discuss it for three reasons: first, because it is a contested matter before the Public Utility Commission, he felt it inappropriate to discusss it with me; second because he said he is not entirely familiar with all the recommendations in the report; and third because he has an argument in Commonwealth Court this morning.

I am being sent a copy of the report and I will look at it.

If Mr. Arnold has any additional information this morning, he is, of course, free to present it. Otherwise, I will simply wait until I can have a chance to review the report, and if I feel it is appropriate to enter any portion into the record, I will report that to the Board when I have done so.

CHAIRMAN SMITH: That will be very helpful.

Whereupon,

ROBERT C. ARNOLD,

the witness on the stand at the time of recess, resumed the

stand and testified further as follows:

CROSS EXAMINATION (Resumed)

BY MR. ADLER:

Q Mr. Arnold, I have a few questions on the qualifications of three of your new management personnel. These gentlemen appear to have very strong qualifications and appear to be very able; however, we are somewhat concerned with one aspect of their past qualfications, and that is their apparent lack of previous experience in the private sector with large-scale commercial nuclear power reactors, and I would like you to comment on them.

We will start on page 9 with Mr. Clark's qualifications.

(Pause.)

I note that Mr. Clark has spent 25 years in the Navy under Admiral Rickover, and I wonder if you feel that his lack of experience with large commercial reactors will in any way impair his ability to assist you in GPU Nuclear Corporation in the fulfillment of his duties.

A Mr. Adler, I do not think one would deny that the broader the experience base that one has, that that carries with it advantages. I think I would also say that time constraints spent in any one area of endeavor necessarily limit the experience one gains while involved in a particular area of endeavor.

So there are obvious advantages to a broader base of experience, but there are offsetting advantages, I think, to prolonged involvement in a more restricted or, say, a less diverse area of experience in the amount of expertise that one is able to develop in that area.

I think the critical elements of the background that the senior management people within the GPU Nuclear Group and Corporation need to have are, first of all, a deep immersion in a high technology activity. I think second that they need to have experience in an area where the concerns for safety and the treatment of safety issues is systematic and institutionalized within that technology.

I personally feel that the experience that Mr. Clark and others have gained in the Navy's nuclear program provide them with a very, very strong base for supervising, managing, planning and directing our operations in the GPU Nuclear Corporation. I do not see it as any significant disadvantage that their efforts have been in an area where the size of the reactor is somewhat smaller.

I think the far offsetting -- when I consider that minor disadvantage -- is the advantage they have had in seeing the maturing of a particular technology, their involvement in that maturing, their involvement in making provisions for the maintenance of safety, the high degree of discipline, a very highly trained organization while that

organization was going under tremendous growth, was undergoing tremendous rate of turnover.

I think those will much more than offset whatever minor disadvantage there is in not being experienced with large commercial power reactors.

Q Do you feel that the degree of focus on safety issues in the same in the Navy nuclear program as it necessarily has to be in the commercial nuclear programs?

A Based upon my six years in the Navy's nuclear power program, I do not sense any difference in either the need or the emphasis placed upon safety of operations.

Q Your answer is a good generic answer to my questions with respect to all three of these gentlemen. I would like to focus a little bit more on each individual.

With regard to Mr. Clark, aren't there any specific duties that Mr. Clark will have to fulfill that would require him to have an in-depth knowledge of the design and functioning of a commercial PWR?

A Well, I think the first thing I would say is that I think Mr. Clark does have an in-depth knowledge of the design and functioning of pressurized water reactors. I would not assert that he has an in-depth knowledge of the specific design features of the Babcock & Wilcox plant, but he has certainly an in-depth knowledge of the design considerations and particular the design considerations for

maintenance of safety of the core.

In terms of the specific duties which he has, I think that it should be clear that with the capabilities that we have brought into the organization, the technical resources that we have there, the way in which we are designing for the cross-check and balances to be applied within the organization to activities, operating activities, design activities, modification activities, that no one individual is solely relied upon to bring to the table, so to speak, in the course of conducting those activities a unique contribution that is not available from anybody else within the organization.

And I think that the appreciation for the complexity of the technology, for the subtleties that may be involved in looking at safety issues is much more important among the senior management than their particular expertise in a specific technical issue; and I think that Mr. Clark has demonstrated during his tenure with the Naval reactors program and certainly during his year with us that he does possess the requisite management maturity and understanding of how these kinds of activities have to be controlled, how they have to be overseen, and that he has a very ample basis for serving in the role which he has with the Nuclear Corporation.

Q Based on that last answer, your response to the

fact that Mr. Clark does not have an in-depth knowledge of the specific design and function of a Babcock & Wilcox pressurized water reactor is that he will necessarily have to rely on the technical expertise of other members of your organization. Would you say that that is correct?

A Yes, I think that is correct, but he will be able to do that with a knowledge of what the fundamental issues are and with the availability of resources across the organization that he can utilize to cross-check and calibrate the information he may be receiving from one particular element of the organization.

Q Would you say that there are any decisions that would fall within Mr. Clark's responsibilities that would need to be made on an extremely expedited basis that relate directly to the safe operation of TMI-1?

(Pause.)

A I think the answer to that is no; and in giving that answer, I see as the occasions where an immediate response is necessary for safety considerations to be those that are associated with emergency conditions existing at a particular plant. I think that the TMI-2 accident demonstrated, among other things, that you cannot manage the control of that type of casualty remotely, and I think that what we must do and we have taken steps to be sure we are accomplishing is that we provide on the site, on the scene

of the emergency the necessary capabilities to gather the information which is needed to assess conditions and to determine what action is necessary to control or mitigate an emergency situation, and that those actions have to be able to be taken by the people located at the site.

While we are providing, as are others such as the NRC, substantial backup for monitoring and review of how the site-located people are responding to the accident and to assist them in that response, the lead responsibility for the response has to rest at the scene of the emergency.

Q So, would you say that all top management officials on site who would be responsible for the conduct of plant operations during an emergency would need to have the requisite specific knowledge of the design of a Babcock & Wilcox reactor, and in particular TMI-1?

A I think that is true as it relates to aspects of the plant design that provide for protection of public health and safety.

Q Let's turn to Mr. Hukill's qualifications on pages 10 and 11. I note that Mr. Hukill joined GPU this past June, and I wonder if he will have attained, in order to fulfill his responsibilities as director of TMI-1, the necessary specific knowledge of the design and operation of that unit.

A I think I have no reservations in answering that

in the affirmative. I think that a marked difference between Mr. Hukill's background and Mr. Clark's background is the extensive involvement that Mr. Hukill has had in power reactor operations, and while the size of the facility is different, the fundamental safety concepts and the approach to protection of public health and safety are not different.

I think that the aspects of the plant design which are germane to those issues, Mr. Hukill will be able to have ample time to know in detail. And while there may be some aspects of the plant operations which he will not be as familiar with when we restart as he will be a couple of years later, I do not think those are the areas in which we would have concerns relative to the ability to control emergencies that threaten public health and safety.

And I think that he will also have a very strong staff, a staff that is very knowledgeable about all design features of the Three Mile Island Unit Number 1 facility. And he has the experience, the management maturity to know how to utilize those resources, draw on those people, integrate their efforts and their knowledge to maximize safety considerations.

Q You stated that the size of the facility is different from Mr. Hukill's past experience. Which reactors were you referring to?

A The Three Mile Island Unit Number 1 reactor is a substantially larger reactor in terms of its power rating than the reactors which Mr. Hukill was qualified as chief operator for in the Navy program.

Q Has Mr. Hukill's experience been limited to Naval reactors contained in a ship?

A No. I think that it would be wrong to say it has been limited to that. That is where essentially all of his operating experience has been gained, but subsequent to his retirement from the Navy, he was also involved with Burns and Rowe on their Breeder reactor project, so that he had some familiarity with the design considerations and design concepts of that project.

I think the exposure was on the order of a year, so obviously there are limitations to how detailed that would be.

Q Aren't there substantial design differences between a Breeder reactor and a pressurized water reactor?

A There certainly are.

Q Now, you also said that Mr. Hukill will have ample time prior to the operation of TMI-1 to acquire adequate knowledge of the specific design characteristics of that reactor. If you were to fire up TMI-1 tomorrow, would you be comfortable that Mr. Hukill is adequately qualified to perform all of his responsibilities there?

A Since there is no prospect from a physical standpoint aside from an administrative standpoint for that happening, I frankly have not asked myself that question. Mr. Clark and I do plan on reviewing that specific question within the next three or four months, so if at that point in time we feel there is more that needs to be done for Unit 1 restart, we will have time to do that in terms of additional training for Mr. Hukill.

Q I assume from your approach to this question that Mr. Hukill is on what you might call a learning curve and he is currently educating himself as to the specifics of the design and operating characteristics of TMI-1.

A Yes, I think that is true.

Q On page 27 you discuss the qualifications of Mr. Manganaro, and I wonder if you would address his specific qualifications with respect to commercial PWR plant experience and the fulfillment of his responsibilities heading the Division of Maintenance and Construction.

A Mr. Manganaro has no commercial nuclear experience. Mr. Manganaro's assignment within the GPU Nuclear Corporation does not involve operations of the facility and he is not responsible for determining the proper design and modifications which he will be implementing from a safety standpoint. That will be done by the Technical Functions Division.

His experience in the Navy included a commander of a Navy shipyard which accomplished nuclear ship refueling and overhauls, and the major safety element or safety considerations for those efforts that were within the responsibility of the maintenance force for which Mr. Manganaro was responsible for managing and directing have to do with worker safety and most specifically with radiation protection considerations. That is, the radiation workers.

So that he did in that role have to ensure that within his organization there was an adequate understanding of radiation safety, that the organization had a program in place to ensure that the workers perform their duties consistent with radiation protection practices, and that there was a radiation protection monitoring capability program, program and implementation equivalent to our Radiation Protection Division activities.

His responsibilities in the GPU Nuclear Corporation are essentially equivalent to that. He will be responsible for the management and the direction of maintenance personnel and craft personnel who are performing maintenance and modifications in radiation areas and on contaminated systems.

So that it is important that he have an understanding of the principles of work in the radiation field and work on contaminated or potentially contaminated

systems. So that there is the direct applicability of his prior experience to what he will be doing with us. But he does not need, in order to adequately fulfill his responsibilities, an operational background or even a design background for nuclear safety issues.

Obviously that is helpful and I think it would be an underestimation of Mr. Manganaro's technical competence to not credit him with a significant recognition of safety issues and the fundamental design features for safety. But the utilization of that technology is an assist and no an essential element to his fulfilling his duties.

Q Mr. Arnold, I have a few questions on the corporate transition to GPU Nuclear Corporation.

Now, you have already explained the timing of the various government approvals necessary for the transition. Was it your testimony that the GPU Nuclear Group will be able to function in the same fashion until all of those approvals are attained?

A If it was not, it is my testimony that they will.

Q So there will be no adverse effect on operations until any of those approvals come through.

A No. The principle that we were trying to and I think are putting into place is to put the organization into a place that it will be responsible for the nuclear activities, and I think the transition from the GPU Nuclear

Group to the GPU Nuclear Corporation will essentially be invisible to those below Mr. Clark and myself.

Q All personnel, as I understand it, in the GPU Nuclear Group have precisely the same functions as they will in the GPU Nuclear Corporation; is that correct?

A Yes, sir.

Q And I suppose the key question is whether they will operate with the same level of authority vis-a-vis the operation of the plant as they will when the transition occurs.

A For the plant people, I do not think there will be any difference. There will not be any difference for the support functions, but in some cases it will be less cumbersome when we are all in a single company instead of in three companies.

Q Will there be any difference with the legal authority to operate the plant or the responsibility and accountability to the NRC?

A Well, since that is a legal question, I may have to somewhat qualify my answer, but I do not anticipate that as president of the GPU Nuclear Corporation, that I or any of the other officers of the Nuclear Corporation will have a different legal accountability for performance of our duties when we are in the Nuclear Corporation from what we presently have as officers in the individual operating

companies or the service corporation. Those accountabilities are the same.

Q So, as I understand your testimony, the only real purpose for the change is one of convenience; that the functioning of the organization will be less cumbersome.

A No, that is not my testimony at all. There are many, many other advantages to going to the GPU Nuclear Corporation, I think, besides convenience. I think that the implementation of the concept itself is a very important item within the organization.

I think that the identification of a separate company wholly dedicated to the nuclear activities of the GPU Service Corporation is an important element of the context in which we are carrying out our responsibilities. There clearly will be a much more convenient administrative process to the single organization, but the substance of that issue goes far beyond those conveniences.

Q I just have one more question, Mr. Arnold. On page 24 you are discussing the challenge you face at TMI-2 and the necessary resources to deal with that problem, and in the last sentence of that first full paragraph you say that it is envisioned that any increased resources needed at TMI-2 would come from external sources, principally Bechtel.

I want to clarify that you do need long-range

increases in resources there and not resources necessary to deal with some sort of emergency situation arising at TMI-2.

A Yes, that is true. We have in place the resources necessary to cope with an emergency occurring at the site. If it were a situation that could not be controlled completely in a matter of hours, then there is no question that we would then draw on outside resources, analogous to the way in which we had to bring in outside resources for the accident on March 28, 1979.

CHAIRMAN SMITH: Would you elaborate on that point, Mr. Arnold? If there are any evolvements of that system or method that was used, has it been formalized, institutionalized, the availability of other plant operators in the case of an emergency?

THE WITNESS: The formalization and the institutionalization of it has not been completed yet, to the best of my knowledge. There has been developed through a committee set up by the Atomic Industrial Forum, which has worked with the Institute for Nuclear Power Operations for a mutual pact, as it were, an agreement between the various utility companies for the provision of resources to assist each other in the event of an emergency.

There is agreement in principle among the member companies, and the last I knew, which was about two weeks ago, there was still some discussion over specific language

in the agreement having to do with liability of the companies in the event that they worked at another facility.

CHAIRMAN SMITH: Has the B&W owners group or have B&W owners participated very heavily in this planning?

THE WITNESS: I guess I would want to go back and check to be sure that all of them were involved, but I am quite confident that all the B&W owners are involved. One of the leaders in putting together this agreement has been Duke Power Company, which, of course, operates three B&W reactors.

CHAIRMAN SMITH: I notice that Mr. Lee will be here. I do not believe, however, his testimony touches on that, but that might be an area where Mr. Lee can be helpful when he arrives.

MR. BLAKE: I just made a note on Mr. Arnold's testimony in that regard to alert Mr. Lee, and I will alert him that the Board has expressed an interest in this area.

MR. ADLER: Thank you, Mr. Arnold.

Mr. Chairman, Mr. Dornsife did plan a few additional questions. Now, he was called to a meeting this morning and expects to be here very shortly. I wonder if perhaps the Board could proceed with their questions and he could proceed later.

CHAIRMAN SMITH: Okay, except we will call upon Mr. Swanson for cross examination.

MR. SWANSON: We have just a few questions.

BY MR. SWANSON:

Q Mr. Arnold --

MR. BLAKE: Before we start, yesterday based on the various discussions and suggestions made by the staff and by us on expediting, was it the Board's decision yesterday that cross examination plans would be filed before the individuals testified but not five days in advance?

CHAIRMAN SMITH: We did not adopt that.

MR. BLAKE: Okay. Just do it in time so the Board would be alerted to questions, but not five days in advance.

CHAIRMAN SMITH: Yes. We do not insist upon it. It would be helpful but we have found if it is given soon before the testimony, the morning of the testimony it has usually been adequate. I would say if it is a very long, involved cross examination plan, we should have it more in advance.

MR. BLAKE: Thank you.

CHAIRMAN SMITH: Mr. Swanson.

BY MR. SWANSON: (Resuming)

Q In your testimony, Mr. Arnold, you discuss the Nuclear Safety Assessment Department. Would that be the group that would be responsible for reviewing the equipment in the plant, say, for example, the B&W equipment, analyzing it, deciding I guess initially what equipment should be in

the plant, whether it is the proper equipment.

Would that be the group that would sort of be the trouble shooting and analysis group?

A No, Mr. Swanson, it would not be their lead responsibility. The responsibility for the technical aspects of the plant rests with the technical functions. The Nuclear Safety Assessment Department personnel are chartered to review design aspects to review equipment performance, but they do that on a sort of minister-without-portfolio basis, and they are not relied upon by the organization for the systematic review of those issues.

Q That reliance is placed on what you call the Technical Functions Group.

A Yes, under Mr. Wilson, the Director of the Technical Functions Division, those activities are systematically pursued.

Q I see. So the company relies on that group for evaluating not only, for example, B&W equipment but analysis procedures as well.

A To the extent that we do the analysis and the review of better equipment and the evaluation of that equipment, that is done within the Technical Functions Division, and to the extent that we internally do review of procedures for technical accuracy and integrity, that is

done within Technical Functions, with some exceptions.

We will be utilizing the Plant Engineering Group to review the technical adequacy of maintenance procedures, and in that case they will be reviewing them for conformance with the technical requirements of the system as established by the Technical Functions Division.

Q Which group would review P&W recommendations on training? Would that be the Technical Functions Group also?

A The Technical Functions Group would look at training for technical content and for technical consistency, that is, consistency with the design of the plant. There would be other people that may well look at the training, and that would include obviously the training department of Nuclear Assurance and the plant staff.

Q But again, you are talking about in-house staffing as providing the type of analysis of training which you would rely on.

A Well, I am talking about where the lead responsibility for that activity lies within our organization. Depending upon what it is that we are looking at, what the nature of the specific product is that is being examined, we may well utilize outside resources of varying kinds.

Q By that you are referring to outside contractors retained by -- well, now it would be GPUNC, but in the past

it would be Met Ed.

A It certainly includes outside contractors. I am not quite sure that I understand the specific kind of activity you are asking the questions on.

Q Well, to what extent, if any, for example, would you rely on NRC staff review or analysis to provide the assurance for you that equipment analyses, et cetera are adequate?

A I think that we would rely upon the NRC staff analyses for the adequacy of analyses which were done by them and which were reported by them and where they have accepted the work product of someone such as an NSSS supplier. We certainly do feel that the NRC's reviews and analyses are of substance and are something that can and should be relied upon.

That does not mean that we do not also look at those areas, but certainly we take credit in our work and in the performance of our activities for work done by the NRC.

Q This might clarify your use of the word "them" in your answer. You said you would rely on NRC analysis of work performed by them or -- I have forgotten the exact wording you used, but by "them" you were referring to the NRC staff, right? In other words, you would rely on analyses or review performed by the NRC staff or by, say, generic reviews of contractors working for them, meaning the

NRC staff. Is that correct?

A Yes, in the sense that we would not try to normally duplicate that effort.

Q But you would not rely on the NRC staff to perform reviews of work done by your own contractors such as B&W, would you?

A Yes. I think there are instances where we very clearly do that. A B&W work product is submitted to the NRC for their review and for their certification or qualification on the acceptability of the B&W work, for example.

Q Can you think of some examples that are specific to TMI-1 where you would rely on NRC's staff review as opposed to your own review?

A I think we would put a great deal of reliance upon the acceptance of codes used by the B&W for safety analyses which have been accepted by the NRC as acceptable for performing those analyses.

Q Are there any other areas that you can think of where you would rely on the NRC staff review as opposed to your own in-house review with respect to TMI-1?

A Well, Mr. Swanson, I am not, you know, the lead witness on specific technical issues, and I think that for me to sit here and try to identify the various specific activities where that reliance would be placed is really not

appropriate. I think that we should either provide other witnesses or I should be given the opportunity with additional staff work.

Q Who would you suggest that is scheduled to testify that would be familiar with these types of -- well, the information I have been asking about?

A I think both Mr. Wilson and Mr. Keaten could address those more knowledgeably than I can.

Q Okay, thank you. Just one more question.

Have any procedures been implemented since the accident to account for and make sure that information becomes disseminated throughout the organization regarding the events at other reactors?

A Yes, sir. We have increased the resources that we are applying to the review of Licensee Event Reports. All Licensee Event Reports now do come in to the plant analysis section of the Systems Engineering Department, which is in the Technical Functions Division, and they evaluate those LERs and identify the other elements of the overall organization that need to be made aware of those experiences for proper review and appropriate reflection within their activities, such as training, plant operating procedures, design features of the facility.

MR. SWANSON: We have no further questions, Mr. Arnold.

BOARD EXAMINATION

BY DR. JORDAN:

Q First of all, Mr. Arnold, a little clarification of your testimony on page 6. I notice in the first sentence of the second full paragraph that you said that prior to the accident the management of GPU has recognized that our nuclear activities would benefit from expansion of our in-house technical capabilities, much greater involvement by the engineering groups active during plant design and construction with the technical functions necessary during plant operations, and a consolidation of the technical and management structures responsible for GPU's nuclear activities; and then you mentioned the Forked River Nuclear Station project.

Now, first of all, where does the construction on Forked River stand?

A The Forked River construction or the Forked River project has been terminated.

Q It has been terminated.

A Yes, sir.

Q I see. That would have normally then have been -- had it not been terminated, that would have been a part of the GPU Nuclear Corporation; is that right?

A Yes, sir, and we do have responsibility for preservation of the equipment that is on site pending the

disposition of that equipment, and we have responsibility for environmental matters, fulfillment of the environmental license requirements at the site.

Q The only plants, then, that you have immediate concerns with are the TMI-1, TMI-2 and Oyster Creek.

A Yes. I would add one clarification, I think, to sort of complete the picture, and that is that the GPU system has the Saxton Nuclear Experimental Corporation within its corporate structure. The Saxton Nuclear Reactor is mothballed, and the Nuclear Corporation documents will be revised to reflect that we will be maintaining the surveillance of that site during its mothball stage.

Q I see.

I notice that your testimony has been primarily addressed to the overall management, of course, but you do address the issue, number one, of the CLI-80-5 document; is that right? Is that the right number?

CHAIRMAN SMITH: Yes, that is right.

BY DR. JORDAN: (Resuming)

Q I myself have been particularly concerned with issue number seven.

CHAIRMAN SMITH: I have difficulties, incidentally, when you assume we have memorized all 11 issues on that, but number one is whether Metropolitan Edison's command and administrative structure at both plant

and corporate levels is appropriately organized to assure safe operation of Unit 1.

Item number 11 is --

DR. JORDAN: Number 7.

CHAIRMAN SMITH: Number 7. Whether Metropolitan Edison has made adequate provisions for crews of qualified individuals to provide safety review of and operational advice regarding Unit 1.

DR. JORDAN: Yes, that is the one I was looking for.

BY MR. JORDAN: (Resuming)

Q And I have noticed that Mr. Clark, I believe, has been assigned the responsibility of addressing that particular issue; is that correct?

A Yes, sir, it is. I would be glad to respond to questions to the extent I can, but we have scheduled him to respond in detail to that.

Q I see. Do you feel that Mr. Clark has the knowledge, the expertise and so on to respond, say, better than you with respect to that issue, and is that the reason why Mr. Clark was chosen?

A I would hope that we would have equivalent knowledge of the plans and the processes by which we are going to be providing that within the GPU Nuclear Corp. I think one of the advantages that we see to having Mr. Clark

sponsor that testimony is that he has more extensive experience in another environment, in another system and can provide better comparisons for how other organizations specifically have a nuclear reactor program provided independent reviews and operational advice.

But in terms, I think, of how we intend to provide independent review, provide operational advice and oversight of operations, I think frankly I am as knowledgeable as Mr. Clark, as we designed it pretty much together.

Q Well, let me describe a little bit my concerns, and perhaps we should decide whether you want to address it or -- well, I will certainly have questions for Mr. Clark, partly, perhaps, to explore Mr. Clark's understanding and depth of knowledge with respect to these issues.

However, I am chiefly concerned with whether the requirement in issue number seven has been truly met. Let me give you the basis for my concerns with respect to that. Following the TMI-2 accident there were, of course, many documents written with respect to that, and a large number of items have been identified, and the most recent summary of these items does appear in the document NUREG-0737.

However, when NUREG-0694 came out I raised questions concerning whether the requirements of NUREG-0694 and a number of other documents would be applied to TMI-1, either prior to restart or as long-term items. And one of

the items that I was particularly concerned about was item I, that is, Roman numeral I.V.1.2, and that has to do with the evaluation of organization and management improvements of near-term operating license applicants.

I realized that whether near-term operating license improvements are going to be applied to TMI-1 has been a matter of some difference between Metropolitan Edison and the staff. However, this has the clarification of that item, and it has been spelled out in NUREG-0737 with the same number on page 3-40, and I do not ask you to turn to it yet.

I do not want to go into it at the moment, the details, but there are a number of items required and it starts off with the position that each applicant for an operating license shall establish an on-site, independent safety engineering group -- it is called an ISEG -- to perform independent reviews of plant operations.

I also noted many months ago that TVA initiated on their own that there would be a nuclear safety review staff and they spelled out the functions in considerable detail, which had independent review of nuclear plant design, independent monitoring of nuclear plant construction, eight items in all, such as investigation and review of operating events or incidence at TVA plants or other plants.

And it appears to me at the time talking with

people from TVA that they thought it was a very important function to have such a group which would keep them independent, so to speak, well, of the manufacturers, for example, B&W, GT or whatever; that they would not become sort of pawns to these organizations; that they would be able to make up their own minds with respect to the design of the plant and the safety of the plant. And to do this would require a very strong group.

Now, I guess my first question is does the Licensee believe that they are complying with the requirements of NUREG-0737, particularly with respect to this one section, I.V.1.2, or is it their position, is it the Licensee's position that compliance with this is not required, it is only required of near-term operating licenses?

MR. BLAKE: I wonder, Dr. Jordan, if I might provide Mr. Arnold with a couple of documents. One of them is our response to 0737, which Mr. Trowbridge referred to yesterday. It was dated January 23. The other is -- it in turn refers to the NRC staff supplement, for example. If I could just hand him these. Oh, fine, that would be most helpful.

(Counsel handing documents to witness.)

(Pause.)

CHAIRMAN SMITH: Would you like to have a break,

Mr. Blake?

MR. BLAKE: No, I do not think so.

THE WITNESS: Dr. Jordan, if I could be given a little bit of license to wander a bit and try to address the issue you bring up.

BY DR. JORDAN: (Resuming)

Q Please do.

A The first thing that I am not sure of is that in the treatment of I.V.1.2, an evaluation of organization and management for NTOLs, that the ISEG issue was part of that. I am just not sure as to whether or not it is. As I understood you to quote from one of the documents, it appears to be included within that.

Let me say first of all that on page 42 of the supplement to the Safety Evaluation Report --

Q Yes, thank you, I have it.

A Item number G there, second paragraph, it identifies that the staff has reviewed us against a July 1980 version of the draft guidelines for organization and management improvements -- excuse me -- for the draft criteria for utility management and technical competence as published in NUREG-0731, and the results of that concluded that we are in conformance with the draft guidelines.

I am not sure at this time that the ISEG -- I guess I take that back. It is my recollection that the ISEG

is included in 0731. And it identifies six rather generic or general descriptions of what the ISEG is supposed to accomplish.

Now, I think it is also helpful in, I guess, forming a judgment as to how we approach this issue, a review of operations and operational advice, to give you a little bit of the background of how that aspect of our organization developed and the timing of it.

I think before, or if not before, then almost in consonance with or coincident with the issue of 0654 or, more correctly, I guess, the forwarding of 0654 to the Commission by Mr. Denton in which the first documentation was provided on the ISEG --

Q Was that on 0694?

A Lessons Learned Task Force. I thought it was 0654. Lessons Learned Task Force report. And if I misstated the reference, I apologize.

Q It is the TMI Lessons Learned Task Force. I think that is 0578.

MR. BLAKE: That is correct, Dr. Jordan, the initial Lessons Learned Task Force.

THE WITNESS: I stand corrected.

On 0578, on the forwarding of that to the Commission Mr. Denton identified that he was also including for Lessons Learned the need or the ISEG. I think that was

the first reference to it. At that same time, approximately, we were finalizing our plans for organization and those plans included an on-site group which we called the independent on-site review group, or IOSRG.

As we have matured our plans, we see a very great deal of similarity in our concept for the IOSRG and Mr. Denton's ISEG, and we have assigned to the IOSRG five of the six functions which are identified in 0731 as being the responsibilty of the ISEG. The six functions we have assigned to the Technical Functions Division because we -- it has to do with, well, with the responsibility for detailed review and analysis of plant operating experiences.

And while the IOSRG will review the results of those, the initial evaluation and development of reports really needs to be within a line function. I do not think it is within the capabilities of a relatively small group, four or five people, to perform that function in depth. So we have identified th[illegible] that particular function will be done systematically w[illegible] Technical Functions.

BY DR. JORDAN. (Resuming)

Q This will include the LERs, then.

A Yes. The LERs are done systematically within Technical Functions, as I mentioned earlier, but the output from those evaluations, both LERs and our own plant operating experiences, will be available to the IOSRG. I

think we find ourselves sometimes getting a little tangled up with the language when we talk about reviews and indepedent reviews and other things. So let me elaborate just a little more on the concept.

Q Would you just, before you do, point out where in the organization chart the IOSRG shows? Is that in the in-plant, on-site organization?

A It is an on-site organization but it reports into Technical Functions, specifically the systems engineering -- I'm sorry. Excuse me. It reports to Nuclear Assurance, specifically to the Nuclear Safety Assessment Department.

CHAIRMAN SMITH: That is indicated on the chart on page 9 of the SER supplement, if that would be helpful.

THE WITNESS: We are in a period of transition yet on that, so that the person who will head up the IOSRG is currently shown, I believe, on Mr. Hukill's testimony as the safety review manager. He is a full-time chairman of the GORB, which is the review committee which is currently in existence and functioning, and we will be transitioning over to assign him as the supervisor of the IOSRG, and he will be reporting in that role to the Nuclear Assurance, specifically into the Nuclear Safety Assessment Department.

CHAIRMAN SMITH: I'm sorry, would you repeat that?

DR. JORDAN: That is a little confusing. We are looking, by the way, at the moment on page 9 of the

NUREG-0680, the supplement. If you have a better chart than that one that we should look at, by all means.

THE WITNESS: No, I think that chart is quite adequate, and that shows on page 9 the Nuclear Corporation structure. That is the structure we are going to. It shows the safety review manager, who is the head of the ICSRG, reporting to the manager of the Nuclear Safety Assessment Department, who reports to the Vice President of Nuclear Assurance.

We currently have tech specs that require a plant operating review committee, and until those tech specs are changed to reflect our changed way of providing for reviews, we have to continue to function with the plant operating review committee. The person who is currently assigned and will be assigned as a safety review manager is now assigned as the chairman of the plant operating review committee, so he is performing that type of function currently within the tech spec structure.

BY DR. JORDAN: (Resuming)

Q Let's get some names on these, then. The safety review manager, which is IOSRG, what is his name?

A Mr. Nelson.

Q Nelson?

A Nelson, N-e-l-s-o-n.

Q Then the manager of NSAD.

A That has been filled for the past several months, perhaps eight or nine months, by a gentleman by the name of McCormack. Mr. McCormack is with the firm of Burns and Rowe, and in order to get that activity started immediately, we got him from Burns and Rowe. We have a new person reporting who has just reported, and I will have to check to get his name. Let me do that.

CHAIRMAN SMITH: We have quite a few questions about this person and his role, so as a matter of fact --

DR. JORDAN: It may be we want to bring this person in so that we can --

THE WITNESS: I would suggest that when Mr. Clark comes on, we have Mr. Nelson join him.

CHAIRMAN SMITH: We also are interested in talking with the manager of quality assurance, and also Mr. Herbein. This is the person you testified is the vice president of the GORP 2.

THE WITNESS: Yes, sir.

CHAIRMAN SMITH: One of the things that concerned me about your testimony, Mr. Arnold, is the Board conceives these as being key people in the safety structure of GPUNC, but their importance did not shine through in your testimony. And then today, for example, you don't seem to be particularly aware of who the person is.

I understand the problem that you are just getting

organized, but we would like to have testimony presented which convinces the Board that -- either we have misperceived their importance or their importance is perceived correctly, but recognized in the corporate structure and in their prerogatives and responsibilities.

MR. BLAKE: Lest there be misunderstanding, I think Mr. Arnold's testimony can stand by itself and he has emphasized the importance to safety and of the independent reviews. In fact, that is why we regarded it as so important as to put it right in Mr. Arnold's testimony and to lead off with it. I do not want the Board to misunderstand the importance with which we regard these things now.

CHAIRMAN SMITH: Not at all.

MR. BLAKE: Through Mr. Arnold and the questioning of Mr. Arnold, which I think is helpful now to the Board and the parties as well, and through the questioning of Mr. Clark, and we will provide whatever more witnesses you want. Believe me, we will provide whoever you want, as I indicated yesterday. Mr. Herbein was here yesterday. He is here today.

I had envisioned that possibly after you heard from Mr. Arnold and his views of the quality assurance and the independent review structure again from Mr. Clark on that score, there might be an opportunity right after Mr. Clark appears to here from -- Mr. Kazanas is also here, Mr.

Herbein, Mr. Whitesell, any one of the gentlemen.

CHAIRMAN SMITH: I am aware you had made these people available. I am not questioning that. The reason I am raising it now, I would like to see from Mr. Arnold's perspective how he feels and believes the importance of this --

MR. BLAKE: That is important. I think this will be helpful.

THE WITNESS: If I could respond, I guess I am dismayed at the impression that I have made in terms of perhaps not reflecting what I really believe are my attitudes towards these review functions, and I think that perhaps in explanation, I think that one of the concepts I felt has been very important in structuring and staffing and in providing guidance to our organization is that it is absolutely essential that the people we put in place have the capability to do the job right; that they understand that they are accountable for doing the job right and that our primary reliance is upon their doing the job right; and that the safety reviews, the operational device are backups to that first line fundamental capability that has to exist first.

For safety of operations we cannot have an atmosphere, an attitude where the safety of operations is dependent upon or where we rely upon the safety of

operations, on the effectiveness of the review of the review groups. They have to be there. They contribute substantially and meaningfully to the safety of operations, but they do that principally, as I see it, in being able to first through their in a sense backup and review of what the people with the lead responsibility are doing in providing a calibration on how well they are performing and the feedback to that part of the organization as to where they need to improve.

And secondly, and I think this is where the IOSRG as we conceived it and the General Office Review Board as we have conceived of it for years is important. It is the part of the organization that steps back from the day-by-day, crisis-by-crisis type of activity that tends to prevail or tends to often be the case and looks at where is the organization really going, how is it performing overall, where are the soft spots, where are the down the road chuckholes, so to speak; what is it that we need to be reflecting about and feeding into the organization so that they do not get themselves into problems because of their focus on immediate and near-term situations.

I see those as the two major roles that these type of groups fulfill. I think that that is one of the reasons I look at the QA Department as a different type of function than independent review and safety committees. I think the

QA Department is where we institutionalize the systematic check of the day-to-day activities on a day-to-day basis, and the almost real time and high percentage check of the way in which activities are carried out.

I see the safety review functions as not being that immediate in time, and so I think we have tried to recognize that difference in setting up the Nuclear Safety Assessment Department separate from the Quality Assurance Department. We had a lot of discussion internally as to what is the difference in the roles of those two departments.

There was a lot of discussion as to isn't what the Nuclear Safety Assessment Department is doing really a qualty assurance role? Well, sure, generically and conceptually it is a check on quality, but it has a different nature to it, in my mind. It is, first of all, not institutionalized in the sense of having a prescribed regimen that it has to follow. It has the freedom to apply the resources available to it where it chooses to look.

It has the complete freedom to challenge any aspect of what we are doing. It is a lot more difficult to put into the Quality Assurance Department, I think, an ability to meaningfully sit back and look at what are the levels of resources being made available for plant upgrading as a generic issue; what are the priorities that are being

set that determine the timing of when particular modifications are going to be accomplished.

I think that is a lot easier to do with a group that is set aside as the Nuclear Safety Assessment Department is set aside. I think it is a lot easier for the General Office Review Board to reflect on that and to assist the management of the company in providing experience, mature judgment on the priorities which the organization is reflecting and the way in which they are doing work, and the extent of the way they are doing their work reflects our priorities.

I would say another advantage we have with the General Office Review Board, which is located there and is difficult to obtain any other way in a systematic way, is the input from people with experience and knowledge of other utilities' problems and experience, a knowledge of their internal kind of working.

So we do have heavy representation on the General Office Review Board of outside people, and we have selected them with the principle in mind that we do want them to bring to the membership that type of knowledge of what other organizations are doing and what their problems are and how they are approaching those problems.

So I apologize both to the Board and the new member of our organization who is coming in as the chairman

-- the department head for nuclear safety assessment for not recalling his name, but, you know, that is where I am, unfortunately.

CHAIRMAN SMITH: Maybe we have helped and now you will remember it.

THE WITNESS: Yes, sir.

BY CHAIRMAN SMITH:

Q This is the same person you said will be Vice Chairman of the General Office Review Board.

A Yes, sir.

Q In that particular phase of his duties, could you describe what he does? Is it more executive, administrative affairs for the Board? Just what does he do?

A Yes, he does perform that role. What we found from an experience standpoint with the General Office Review Board is that there is a substantial amount of staff work necessary to support them effectively. So that part of our design concept of the organization was that we would locate within the organization and somewhat isolated from other responsibilities some staff capabilities, staff resources, and that will be the corporate people in the Nuclear Safety Assessment Department.

In order to make that staff work most effectively, we thought that making the department head a permanent committee member, a permanent member of the General Office

Review Board would greatly facilitate the integration of that. He would be involved in the General Office Review Board routine deliberations and have the continuity of that and a voice in what they are doing.

It would make his position as department head a more meaningful one, we thought, and giving him the assignment of vice chairman of the board as well. We do anticipate that much of the sort of executive staff work for the General Office Review Board will be done in that department as well.

BY DR. LITTLE:

Q I have a question which sort of follows from this, and that is, both on page 9 in the supplement and on the chart that was handed out today on on-site organization, that the safety review manager function is located in a box on the chart that is accompanied by a lateral dotted line. I don't know about the conventions you used in preparing these charts, but in most organizations if the function is located in a box that has only lateral dotted lines, you have cause for questioning your job security and your ability to have any authority up and down the line.

A Well --

Q What does this mean about chain of command and authority of people in the safety review function to see that their recommendations or suggestions are implemented?

A If we look at page 9, which I think perhaps more completely reflects our thinking, you will notice that the solid line of that person is at the Manager, Nuclear Safety Assessment Department. We see that as giving additional leverage, so to speak, to that safety function.

The dotted lines are there to show that that role in its on-site location is to have close communications and access to the Vice President of TMI-1 and to the Vice President of Radiological and Environmental Controls because in their review of safety of activities, those are the two people that we would expect them to provide advice, counsel, comment to.

But in the event that they are not able to be heard or there is a problem with integration into the site routine of the safety review group, of the ICSRG, they have immediate and direct and clear access to the corporate level through the manager, NSAD, so that if there is a problem, with their voice being able to be heard within the decision-making process of those that are responsible for operations and maintenance, for those that are responsible for implementation of the rad con program, we do not have the compounding of the difficult of getting their viewpoint represented in that it has to come through the same people that they feel are perhaps not being responsive to their concerns. It comes up by the structure of the

organization independently from those people.

BY DR. JORDAN:

Q Well, Mr. Herbein -- I am sorry, Mr. Arnold -- I think your comments, how it stands and the purpose of the organization structure and so on have been very helpful, particularly your philosophy. I will want to go into the organization, see how they equip themselves to be able to carry out the six or seven functions that you mentioned.

I will want to explore the training of the people themselves and I will want to go into what they are doing, what they did in the past and what they believe their job will be. However, I think such great details as that I would not want to burden you with today.

A I would like to make a couple more comments.

Q That is exactly what we want from you.

A I think that first I would like to clarify the relationship or, as I see it, the relationship of the IOSRG to the independent safety engineering group that is referred to by 0731. In addition to assigning the functions that I indicated to that IOSRG, we have also assigned some review functions, some independent review functions to the IOSRG which some later regulatory information would indicate is not perhaps what was envisioned when the ISEG idea was fully developed.

I do not think that is in any sense a substantive

difference in our approach, but it may appear to some to be a substantive difference, and it is not an area that the staff has completed their review of.

I think that we have set up within our organization for an extensive amount of review of work product on an independent basis by others who have similar kinds of capabilities or similar line functions or who have capabilities or experience in a cross-disciplinary way or in another discipline that needs to also look at it.

So we are reviewing -- we are setting up for reviews to ensure that first there is an independent review of any work product and that there is a deliberate decision as to the need for additional cross-disciplinary review, and that decision has to be made by the independent reviewer as well as by the preparer of the work product.

I think I might also say that as we looked at the total scope of activities that had been carried out in the conduct of our operations, some of the earlier sort of approaches to independent review, safety review are a little more simple in their design than fits the situation, I think, in today's world.

So I think that as you become familiar with the details of the structure of our control of activities, you will see that we have a fairly diverse design, a fairly wide -- maybe that is not quite the right way to say it -- but we

utilize the organization to provide review in a variety of ways, depending on what the activity is.

I guess if you go back ten years in the utility operations, by and large you had 40 or 50 people that were pretty much doing everything in these areas. That is not the case today, and I think the design of the control of work and the control of quality of the work has to similarly be made more sophisticated, I guess, or more complicated, in some senses because we cannot -- I think we have to be very careful about feeding through a relatively small group of people, everything on a routine basis because it is just more than they can handle effectively.

I think we have also avoided or attempted to avoid multilayers of review on a regular basis or on a systematic basis. We always provide a minimum of one level of review for any work product.

We provide for a second level on certain categories of work on a systematic basis. Many activities will get a third and fourth review as the IOSRG looks at it on a selected basis, selected on their choice, or the NSAD people look at it because they would like to look at it, or if the GORB looks at a particular activity because they choose to so.

In some cases we do have these multilevels, but we do not in any case that I am aware of require three levels

of review systematically for all activities in addition to what the work done by the preparer -- we have limited that to two as being, in effect, the optimum from a design of the control of the activities. That is reflected in the way in which we use the IOSRG and other functional groups.

I think the other thing that I would mention in kind of forewarning, as I think you got a glimpse in the identification of the department head for Nuclear Safety Assessment Department who is just joining us as our own employee, is we have also had the difficulty in filling the jobs for the on-site IOSRG, and that relates to the level of qualification and experience that we want to have in those positions is much more than our interest in filling them.

So that in talking with my people about those areas, why, it will become obvious that the staffing is incomplete in those areas.

BY DR. JORDAN: (Resuming)

Q It will become obvious what?

A The staffing is incomplete in those areas.

DR. JORDAN: Very well. I will reserve --

(Board conferring.)

BY CHAIRMAN SMITH:

Q Before we get too far away from IOSRG, I think your testimony is that differences that there may be between you and the NRC staff is that IOSRG has more functions than

the ISEG concept anticipated.

A Some of the material I read from the Nuclear Regulatory Commission staff would have the ISEG do all that we have the IOSRG doing but he would not take credit for the ISEG doing some of those functions in terms of the regulatory guide requirements for independent review.

Specifically, Reg Guide 3.2, Section 4.3 on Independent Reviews has a Section 4.3.4 identifying items that need independent safety review. While the latest guidance, I think, would say that the independent safety engineering group has to review all of those items, you cannot take credit, as I understand that guidance, for that fulfilling the Reg Guide 3.2 requirements for independent review of those activities.

You have to have the Reg Guide 3.2 review done by somebody else, and we have attempted to streamline that, in a sense, and not provide those multiple levels of review, if my description is a proper interpretation of it. So it is not that the ISEG does not have to look at those other items. It has to do with what credit you can take for it in fulfilling the regulatory guides.

Q Then what was your reference to IOSRG being assigned five of the six functions anticipated by the ISEG? Was it five out of six or six out of seven? There was one left dangling. We would like to see it undangled.

A What I think I said, Mr. Chairman, is that one of the 0731 listed items for the ISEG is the review of plant operating experiences, and we are not relying on the IOSRG for the systematic review of our own plant operating experiences or for the evaluation on a systematic basis of other plant operating experiences. That is being located within the Technical Functions Division.

So in terms of that requirement for the ISEG, we are taking credit for that in the Technical Functions Division and not in the IOSRG, although the output from the Technical Functions Division will be available to the IOSRG.

MR. BLAKE: Mr. Smith, like the familiarity with the Commissioners -- we need a reference here where the six items are for everyone's benefit. In 0731 they appear on page 15.

DR. JORDAN: Page 15?

MR. BLAKE: Yes, sir. And in the draft document which Mr. Arnold earlier referred to, the July draft on management criteria document, the same items appear on page 28, actually 27 and 28.

DR. JORDAN: I have not --

CHAIRMAN SMITH: We don't have those.

DR. JORDAN: I have not had a chance to look at that document yet.

MR. BLAKE: A quick reading tells me it is exactly

the same, the same items.

DR. JORDAN: I see. All right. I would like to see a copy of the document, if I could, before Mr. Clark testifies or Mr. Herbein or whoever because at that time I will want to go into that things, the people who are doing it and so on, but I will wait for that time and I will have questions for the staff as to whether they have evaluated and the results of their evaluation of this particular item.

I only have one other question for you at the moment.

BY DR. JORDAN:

Q The shift technical advisors, do they report to the Technical Division?

A Yes, sir.

Q That is what I understood. All right.

A I would perhaps like to add that I do not know that we have any issue between ourselves and the staff on the IOSRG and the ISEG, but it is an area that is, I think, still being reviewed by the staff, and I anticipate it will have a compatible outcome.

DR. JORDAN: Fine.

(Board conferring)

CHAIRMAN SMITH: Let's take our midmorning break and return at 11:00.

(Brief recess.)

BY DR. LITTLE:

Q I have a question which may sound complicated, but there are three key words that I will repeat at the end that I would like you to address.

In a technological field, a technological setting, the proof of how well a management scheme works is not the paper organization but how well the man-machine interface works; and I would like you to address the question of what efforts have been made to ensure the understanding of the rank and file personnel who actually operate the controls, how they accept it, what differences they will perceive in the new management scheme versus the old management scheme under which they operated, whether there was any opportunity for the rank and file to express to the management their problems and suggestions for making the day-to-day operations more effective.

So the key words: was there any opportunity for the rank and file to have input into the new program, the new scheme; what efforts have been made to ensure that the rank and file understand the differences; and how well rank and file accept the differences in management.

(Pause.)

A Dr. Little, I am unsure as to whether your question refers to the way in which the organization is structured --

Q That is right, that is right, the new management structure.

A Okay. And you do not want me to address the specific man-machine interface in the control room as that has been addressed within the --

Q No, no, I don't.

A Okay. The way in which we got to where we are on organization design has its roots back in very early '77, at least, when I asked for two different activities. One was by an individual and the other one was by two or three members of the staff that I would have in my position I was assuming the 1st of June as Vice President, Generation, GPU Service Corporation.

The first by an individual was a person who had recently re from GPU, had in effect been a predecessor in several of the jobs that I held and particularly in Met Ed and was an experienced senior manager. His name was John Miller. I asked Mr. Miller and I asked, as I recall, two or three members of the staff to separately put together for me a proposal of how the Generation Division of the Service Corporation should be organized and should be staffed to accomplish the objectives that we identified then with the strengthening of in-house resources.

Those two efforts and kind of an integration of them provided the basis for much of our thinking through the

1977 and 1978 timeframe and our plans that we were implementing in that time period. After the accident, I had extensive discussions with Mr. Dieckamp as to what the organization structure ought to be, both on the interim and the longer-term basis. And of course I had similar discussions in 1978 as we were looking forward to the early eighties and where we wanted to be at that point in time.

What we decided at that time to do, and basically I suggested it, I think, and he agreed is that I had Mr. Fred Glickman, who was on the organization chart, as the Vice President, Administration set aside about three months of his time, and this would be in the July, August, September '79 timeframe, approximately, to in effect develop the proposal for how we would design the GPU Nuclear Corporation.

His effort involved going and talking with the people who were at least within the next two levels of the organization beneath myself, and in some cases further down the organization. He spent many hours in discussions with them and in developing from them or drawing from them their ideas on it.

From that he developed a proposal. It was modified somewhat through discussions with Mr. Dieckamp, Mr. Glickman and myself, but out of that came the basic structure that we have today. We subsequently brought on

board in January Mr. Clark.

We had a meeting for a weekend of about 40 of the management people that would be part of the staffing of the new organization in the first weekend of February of 1980 in which we reviewed with those people our concept of how the organization should be structured, what the various roles would be, and it was clear even at that point in time that the interfaces between them and just what would be the specific scope of the responsibilities of the various divisions did need more thinking through.

And that weekend was used to greatly facilitate that process as well as give common understanding of where we were going with the organization.

I think that other than some sort of refined structure on individuals, through 1980 things remained relatively and up until the present have remained relatively constant on the concept of the organization.

The other effort in terms of how we arrived at the organization that we have that I would think is important is in October of 1980 -- excuse me -- October 1979 we contracted with the firm of Basic Energy Technology Associates to assist us in evaluating our organization, our organizational plans, and Mr. Bill Wagner of that firm, who will be testifying later, had a major role in that organization's participation in that effort on an overall

basis, particularly in the technical area, in the design of the technical functions and their interface with the plant.

Mr. Murray Miles of that staff had a very large role in helping us to think through and articulate the radiological controls design. And I think that we made no significant changes in the concept as a result of their effort, but they were very helpful in flushing out our ideas and articulating how the interfaces would occur.

I think that it would be fair to say that the direct input into the organization plans came at most from what would currently be the section head level of our organization that is down about four levels below myself, but I think that through the work done by Mr. Glickman and by Mr. Wagner as he talked at all levels of the organization, there was substantial interaction with the overall organization on that.

So that I think there was a substantial opportunity for input of ideas and we received input of ideas from many of the people that you will hear testifying in the course of these proceedings.

In terms of the acceptance of the idea, I think you are principally interested in where there may be differing opinions and where there may be difficulties. I think there would be two areas I would address there. One is that because of the way in which we were structured and the

way in which the organization functioned prior to the accident, there had developed, I think, a great deal of sense of them and us type of attitude between the service corporation and the operating companies.

The service corporation basically was responsible for the design, the construction, the startup of the facility. They then turned it over to the operating companies. You know, this is somewhat overgeneralizing, but basically they turned it over to the operating companies to operate, and of course no facility as complex as these are without their share of problems and difficulties that have to be dealt with.

And I think there is a tendency for -- you know, we were given these problems by somebody else and we have to solve them, and there was a sense, I think, the other way from some of the typical types of interpersonal relationships you would expect with that type of a structure.

So I think that that past attitude was evident in the initial acceptance of the new system. Clearly many of the senior positions within the organization were being filled from the outside or from within the service corporation. Fewer percentage-wise were being filled by people from the operating companies.

I think that to a great extent is behind us. I think we have gotten beyond sort of the parochialism that

occurred before and that I think did hamper the initial solidifying of the organization.

The other area I identify is somewhat related to that one. It is also different in degree because of, again, some of the history and the difference in involvement in the immediate post-accident activities. That is that within the Jersey Central organization for Oyster Creek, I think there was initially within sort of the midlevels of the organization much less enthusiasm for this integration across the system than I guess I would have liked.

I think we have had some difficulty in convincing them this would be an overall improvement and getting their wholehearted support for moving together on this kind of a coordinated basis. I think much of that is behind us while not entirely at this point.

So that in terms of the input and the feedback and how it has been accepted, I think that is a fair characterization.

Q Are there any sessions to have all levels of personnel familiarized with the new goals of the reorganization? I realize you are in a transition stage, but somewhere along the line people all the way down should be able to exactly understand who reports to whom and how this is different from 1977, for example.

A Yes. In the summer and fall of 1980, Mr. Clark

and myself made a series of presentations. Some of the material that I used yesterday came directly from those presentations, and I think I updated the status from October '80, for example, to January '81 in what I provided yesterday on it.

And we met at the Oyster Creek site. We met at Parsippany with the corporate people and at TMI to provide the management people, at least, and the supervisory people with briefings on what the organization is all about, what we are trying to do. We are tentatively planning now on another management conference in March, and we are also starting to schedule through our Communications Division for meetings that we would see going down through all levels of the organization in a series that will probably take us several months to discuss the organization and to be sure that we explain what it is we are trying to do, what the purposes are, what the objectives of the organization are, what our sense of priorities and interests are; and that will be direct from Mr. Clark and myself.

It would be with relatively small groups, and that is why it takes a fair amount of time to get through approximately 2000 people.

Q It will go down to the so-called bottom level of the pyramid eventually.

A Yes, it would go down into the hourly employees as

well, eventually. I think we will take kind of several levels at a time going down, but eventually we will try to cover at least representative people from all the way down to the utility worker level.

DR. LITTLE: Thank you.

BY CHAIRMAN SMITH:

Q Mr. Arnold, could you comment generally on what actions GPU took with respect to personnel as to whom they believed performance with respect to events leading up to the accident and during the accident was inadequate? In other words, were firings in the motions because of what the company believed to be inadequate performance? And you can use euphemisms in your response if you wish. I recognize you have also had reorganization, and exact comparisons of duties may not be possible.

A Could I consult with Mr. Blake for a minute, please?

Q Yes, you can; and I appreciate some problems that may be involved in a candid response. I do urge you to consult with Mr. Blake, and we will address any problems that you might have. What I am looking for is how strong was the company in taking remedial action in reassigning and releasing personnel that did not measure up to standards, and, Dr. Little points out, rewarding those who did.

We can come back to that some othe time.

A Fine. That would be helpful, I think, if we did. I might mention, of course, that with the accident as it happened, there was not much glory for any of us.

Q You had indicated in response to our inquiries you had given us much more information about the Manager of the Nuclear Safety Assessment. We want similar information, as I indicated, on the Manager of Quality Assurance, but I will not trouble you with it. We will take it up with Mr. Herbein; would that be better?

A I think either way is fine. We have Mr. Kazanas here today. I offer direct testimony on the Quality Assurance Department.

CHAIRMAN SMITH: What is your preference, Mr. Blake? I would like to release Mr. Arnold and get to the people who have fine details on it if he doesn't. I am talking about who he is, what his professional qualifications are. We will be talking to him directly; we would like to know what his background is, what his professional qualifications are, when did he get out of the Navy, for example.

(Laughter.)

MR. BLAKE: I am sure there is no better witness to speak to Mr. Kazanas' background than Mr. Kazanas himself. We will make him available. But I encourage the Board to get Mr. Arnold's views on any of these matters

while he is here, Mr. Smith.

CHAIRMAN SMITH: All right, thank you. We sense a desire to respond.

BY CHAIRMAN SMITH:

Q You mentioned difficulty in recruiting some of these spots because of the very high standards. Do you sense any difficulty in recruiting persons in competition with other utilities because of uncertainties in the nuclear group and perhaps financial uncertainties that are being discussed now in the press and the trade papers?

A We have had a varying experience in those areas as we perceive it. In the first year after the accident, we did not sense as we recruited people that the uncertainty of the company's financial future, the solvency of the company was a problem. We have never had difficulty in being competitive in terms of our compensation and benefits with other utilities.

We have had problems at times with other manufacturing and the architect-engineers, and when that has become evident to us, we have adjusted the level of the offers or, you know, our approach to be sure that we remain competitive. Over the last six or eight months I think that the situation has changed somewhat.

I think that we have sensed as we failed to come to agreement with individuals that there has been a larger

contribution to the lack of success because of the uncertainty of GPU and the extensiveness with which the news media has carried stories of that uncertainty.

We have also felt quite strongly that the current economic conditions within the country, particularly the cost of housing and the cost of mortgages, have been a substantial impediment to people relocating. With regard to that latter issue, we have taken steps in our structuring of offers to people to try to compensate for those issues, but nevertheless, I think people sense that there is a much greater personal risk in relocating now than there was three or four years ago.

So I think that that currently is a problem that we feel we have and we think that we are dealing with constructively. I think that we have to just be more aggressive in terms of explaining to people what their personal uncertainty might be, even if the corporate uncertainty is great, that theirs isn't.

I think that is a lesser role, but it is not a zero role; a lesser element but not a zero element. So I think that our problems are not uncharacteristic of the industry. I guess where I come out in the end in terms of the shortage of the people with the qualifications and experience that we are looking to recruit are in great demand right now and I think we are getting our share, but

the total inventory is not as great as we all would like to see.

CHAIRMAN SMITH: Okay, those are all the questions I have.

Mr. Dornsife had some.

CROSS EXAMINATION (Resumed)

BY MR. DORNSIFE:

Q Mr. Arnold, going on the last question that the chairman asked you, do you sense a change in morale with the people, considering all the delays and things that have gone on at the site? Is that a potential problem, in your opinion?

A Well, I think any organization that is in the situation we are, morale has a very large potential for being a problem. I think the experience in the first year of the accident was surprisingly good. We did not have an identifiable increase in our turnover rate. The levels of turnover were pretty consistent with what they were before the accident, and I think that there was a high level of morale within the organization as a whole, particularly at the plant site.

I think morale was probably more of a problem in Parsippany where it was remote from sort of the trenches, so to speak, than it was at the site. I think that in late 1980, the second half of 1980, due to the delays and the

rather grim prospects for how soon things would improve, that that was reflected in morale.

I think over the last three or four months we have seen that turn around somewhat. I think there is more of a sense that perhaps we can see the end of the tunnel with regard to the restart of Unit 1. We, unfortunately, do not see the end of the tunnel in the reduced level of activity on Unit 2, and I think that is a substantial problem to us that we are trying to deal with effectively.

I think that the GPU Nuclear Group being in place and starting to function and people starting to understand how it is going to function and gain confidence in the effectiveness of the organization has also contributed to the improvement that I think we have hit the last few months.

Q Will the GPU Service Corporation still exist as a subsidiary of GPU after the reorganization?

A Yes, it will, but it will not have a Generation Division as part of that organization.

Q Will it have any activities related to the Nuclear Group at all?

A The most that I -- well, from a technical standpoint the most that I see is that we will perhaps have some coordinating function within the service corporation for environmental-related activities. Clearly with regard to water quality, or rather water resources, that is the

utilization of public waters.

The Service Corporation will be providing to the Nuclear Corporation the accounting and treasury functions. We will not have those two functions performed within the organization because we did not see that they related even indirectly to the safety of our operations.

Q Will things such as you mentioned, the reliability of off-site power for Oyster Creek, still be a function of that Service Corporation or will that be the operating companies?

A That issue is clearly a GPU Nuclear Corporation issue for evaluation and judgment. Should there be a need for an additional transmission line, the transmission tie, why, the operating company would provide that construction activity.

Q In your presentation you talked about experience. You seem to attach some significance to the SRO qualification or equivalent, and I am wondering if you have a feel for what proportion of the people that you identify as being qualified have actual SRO qualifications compared to the equivalent, which is the Navy nuclear experience. Just a rough proportion, if you can.

CHAIRMAN SMITH: Is that in his testimony?

MR. DORNSIFE: It was in one of the attachments where he identified the number of people.

CHAIRMAN SMITH: The Board intends to have questions on that very area when we get to what we felt to be a more appropriate panel; however, it is an appropriate question.

MR. DORNSIFE: I have some follow-up to this so this is kind of a lead-in.

THE WITNESS: I would say for those listed at the plant sites that probably at least 90 percent of them are in fact senior reactor operator licensed. For the technical functions there are probably not more than perhaps half a dozen or even less which are, in fact, senior reactor operator licensed on a commercial power reactor.

In the Nuclear Assurance, my guess is 75 percent of those approximately are SRO licenses, and in the Radiological and Environmental Controls, the one there is an SRO. In the Maintenance and Construction, I don't think either of those are actual SROs but are what I would consider equivalent levels of qualification.

BY MR. DORNSIFE: (Resuming)

Q What is the highest management level in the operation portion that have SRO qualifications; do you know?

A I believe Mr. Herbein received a senior reactor operator license on TMI Unit 1, and Mr. Finfrock received a senior reactor operator license at Saxton, and I'm sure he had one for Oyster Creek.

Q How about specific to TMI-1, the operating portion, from the Vice President of TMI-1 down?

A Mr. Hukill has not received a senior reactor operator license on Unit 1 or on another commercial plant. He had what I considered to be the equivalent. Mr. Toole qualified, I believe, for SRO on Oyster Creek, and has had extensive experience at TMI during the last seven or eight years.

Mr. Colitz, who is the plant engineering director, has an SRO on TMI Unit Number 1. Mr. Potts, who is in Radiological and Environmental Controls and is at that reporting level I believe had an SRO on TMI Unit Number 1 and is, I believe, the one that we identified in that department.

Q Haven't the previous station managers and superintendents typically had SRO qualifications on TMI-1, and do you consider the fact that the manager and director currently do not, is that by design or would you consider it more desirable to have that qualification?

A All other things being equal, I would consider it desirable to have an SRO qualification, although I do not think it is important to maintain it current, and I think you have to distinguish -- recognize that some of these management positions it is just not practical to maintain real currency on the license.

But I think that perhaps earlier this morning we addressed in considerable detail what I consider to be some of the advantages that Mr. Hukill brings with him that a member within our organization would not have brought to that job.

Q I guess my concern was more for emergency management, the emergency director, who he will be and what his qualifications will be, and the desirability of having someone with senior reactor -- SRO qualifications for that particular function.

A Well, I think if you go back and look at the TMI-2 accident, one of the things that we learned from that accident is that the emergency director's role is one where the effectiveness of performing that is much more dependent upon an understanding and appreciation of the total technology and the ability to provide direction and supervision in a very complex and stressful situation to a fairly large organization, and that the SRO qualification is one measurement of the person's technical insights and technical understanding.

But I do not really feel uncomfortable myself with Mr. Hukill specifically being able to perform effectively as the emergency director without having that specific qualification, although again, as we discussed earlier this morning, there are certain aspects of the plant design which

we all will want to reassure ourselves that he has familiarity with and that do come into play specifically in the role of emergency director; and I think the training that many of us will go through on the emergency plan and qualification for assuming roles in the new emergency plan implementing procedures, those areas will be covered.

Q Will Mr. Hukill be, in fact, the designated emergency director when he becomes available?

A He currently is assigned as emergency director for our emergency program.

Q So basically you are saying that a person without the real nuts and bolts experience may be able to see the big picture better than somebody trying to get down to the system level to determine corrective action and that type of approach.

A Yes. I would not want to say that my answer is restricted to that characterization, but I think that is one aspect that has to be considered in making the judgment.

Q Your testimony on page 20 -- you may not be sufficiently familiar with this to answer it, but it is in your testimony. I am trying to see if you do have a knowledge of it. In the first paragraph at the top, you say the scope of QA responsibilities have been expanded and they include systems and components not classified as safety related but having functions important to safety which have

been added to the program, and I am wondering if this includes other systems and components other than those we have talked about previously in this proceeding.

What typically is the scope of things you added to things being important to safety that were not previously included?

A Well, for the latter question, I think that when Mr. Kazanas is here, he would be a more appropriate one to address that. Whether or not he can put it in the context of whether those systems have been included or not included in testimony previously, I am not sure.

Q I have been wondering, are there other things in addition to the things that were required by the Lessons Learned items that have been included in the classification now called important to safety, or is that --

A I would want him to address that, but I think quite clearly we are applying quality assurance program requirements to systems beyond those specifically required by the Lessons Learned Task Force. We modulate or tailor the requirements to the system functions and its relationship to safety. It is not a full implementation as would be required for safety systems.

Q You say some systems and components have been increased, and you also say activities. Can you differentiate between the two?

A Yes. The application of the surveillance program by the Quality Assurance Department, and by surveillance I mean their observation on a real-time basis of activities, has been expanded in scope and has been increased in frequency throughout the scope over that which we had the resources in place to do prior to the accident.

Q Likewise at the bottom of the page, and maybe you again -- some subsequent witness could answer it better. You are talking about the Nuclear Safety Assessment Department and you say this department has incorporated within it the resources and the assignment to conduct on their own initiative assessments of the safety implications, and I am wondering what are the criteria for this group doing these safety assessments? Is it their own judgment of what they decide to perform these assessments on or is there some written criteria for what their functions will be?

A No. We have specifically established this group such that its activities are not needed, and this is a corporate-level portion of this department, such that its activities are not required to fulfill any regulatory requirements, and that leaves them free to pursue the review and assessment of the safety of activities as they see that being most productive.

They are not constrained or they are not loaded down with specific assignments that in effect curtail the

availability to go look in whatever corners they would like to look in and poke in whatever shadows they would like to poke into.

And I think that clearly we would, through their department head and through their division head and through the General Office Review Board, they would be given inputs and guidance and encouragement to look at specific types of activities or specific areas of activities.

I think also important in that consideration is the role that exists within that department as omsbudsman for the organization. Specifically the department head is designated as the omsbudsman for the organization and he makes himself available to all levels of the organization, both by being at the sites as well as his accessibility in Parsippany for confidential input of information and identification of concerns that people within the organization do not feel are being addressed adequately by the line management.

Q Would you expect that that would be the primary source of their investigations?

A No. I think that their own perception of what would benefit from their independent viewpoint would be a primary source of their --

Q This group then is in addition to a required group that would perform assessments, let's say, for

NRC-identified safety deficiencies, significant safety items?

A Yes.

MR. DORNSIFE: I have no further questions.

CHAIRMAN SMITH: Anything further, Mr. Swanson?

MR. SWANSON: No.

CHAIRMAN SMITH: Redirect.

REDIRECT EXAMINATION

BY MR. BLAKE:

Q Mr. Arnold, yesterday Mr. Adler asked you some questions about the Theodore Barry and Associates report and observed earlier today if you have anything to add on the Theodore Barry report.

CHAIRMAN SMITH: Mr. Blake, would you keep the microphone closer? We are having difficulty. Would you turn this mike on? It seems to affect the other.

MR. BLAKE: Does that work?

DR. JORDAN: Yes.

MR. BLAKE: Okay.

BY MR. BLAKE: (Resuming)

Q Mr. Arnold, have you had an opportunity to review the Theodore Barry report overnight and would you add anything to your comments of yesterday?

A I have reviewed the report in the interim and I think the way I represented its recommendations yesterday was accurate in terms of completeness. I would add perhaps

a couple more items which they made recommendations on. There were recommendations -- a recommendation with several -- a number of specifics to it in terms of documentation and formalization of the statement of the GPU Nuclear Corporation, the individual components and what their roles and responsibilities interfaces would be, including the development of position descriptions for the various positions.

That, of course, is on ongoing activity. It is one that we had under way at the time of the audit, and it is one that we will be completing. Many of the specific items that they have identified have, in fact, been completed.

They identified two other items, two other recommendations that I do not think I touched on yesterday. One was that the company form citizen advisory committees for each of the sites to provide for interface with the communities and ability for representatives of the public to be aware of and in a sense review -- I am a little hesitant to use that word because it is a term of art within our activities.

The functioning of management in the nuclear activities, we have not implementing that recommendation yet but we are looking at what we consider to be the appropriate way of forming such committees, and we have no philosophical

reluctance to do so.

The other is that Theodore Barry Associates felt that the Nuclear Regulatory Commission was substantially and inappropriately impeding the return to service of TMI Unit 1 and the ability to conduct cleanup activities at Unit 2, and that they thought the company ought to undertake a fairly agressive campaign on making that judgment, or presumably a similar judgment know to officials and the public.

We have been less than enthusiastic about undertaking a major campaign in that area, although we obviously -- we have attempted to identify to the Nuclear Regulatory Commission our judgments as to how their regulatory activities are progressing and where we would like to see different approaches, and I think that is a matter of public record.

Q Mr. Smith asked you yesterday about the budget process, and I wonder if, Mr. Arnold, you could provide a specific example or that which would be an application of how the budget process has functioned under the current financial stress which the company is facing.

A Yes. I think a pertinent episode to the questions asked by the Board yesterday, as the budget process occurred in January, as the total GPU system was put in together, the 1981 budget through the last quarter of 1980, our projections were that we kind of ran up against the limit of

our borrowing capability towards the latter part of 1981, about October of '81, and that influenced the planning for the first half of the year, in particular.

At the end of 1980 when we had the year end results available, it became clear that the crisis, I guess is one way of putting it, or the potential crisis would occur much earlier in the year, in the April-May timeframe; amd that to avoid losing control of the situation and not having time for the institutions to respond to that new information, it would be necessary to further curtail the planned expenditures within the GPU system as a whole

There was a series of budget reviews with each of the operating companies, with the Service Corporation and with the GPU Nuclear Corporation. Our review lasted about three hours, as I recall. The decisions were made to make reductions, I believe, in each of the operating companies, certainly at Met Ed where we have had to effect an additional layoff of 35 of our employees.

But for the GPU Nuclear Corporation the decision was to continue with the planned scope of work that we had as a basis for our budget, do that as efficiently and economically as we could, but not to reduce any of the planned activities, and I think it was a direct result of the understanding, the management of the system as to the extent to which our planned activities contributed to

safety, and I think also incompleteness contributed to the expeditious return of TMI Unit 1 to service, which obviously is a cornerstone of the recovery program from a financial standpoint for the system.

I think that perhaps this might also be a chance to correct the record on an answer I gave in another area to the Board yesterday, and that was the question as to whether in the course of the final review of the budget had the reviewer suggested any additional activity from a safety standpoint that we did not provide for in the budget.

I answered that in the negative, and on reflecting on it in the interim, there was a discussion I think that was germane to that question, and that was that in our budget planning we proposed in the 1981 timeframe to have the corporate staffing underneath the Nuclear Safety Assessment Department be about three or four people.

Mr. Dieckamp questioned whether that adequately reflected the role and the importance of that group and asked us to relook at whether some alignment of the allowed resources was not appropriate to increase the staffing in that particular area.

We do not have a problem with that conceptually within our Nuclear Corporation management. The problem really is one much more of being able to recruit the appropriate people, and the three or four represent what we

feel is realistic to be able to recruit those kinds of people rather than the extent to which we think they can contribute.

I think it probably will be 1982 before we get up to the six or seven or eight that I think will be the longer-range staffing of that corporate section.

MR. BLAKE: No more questions.

CHAIRMAN SMITH: Is there anything further of Mr. Arnold?

MR. ADLER: Yes, sir.

RECROSS EXAMINATON

BY MR. ADLER:

Q Mr. Arnold, I just have a few questions on the Citizens Advisory Committee recommendation of the Parry report.

You, of course, agree that your firm's credibility and the respect in the community has been degraded since the accident.

A I guess I am not ready to agree it has been degraded since the accident. I think the accident --

Q As a result of the accident.

A -- resulted in that, but I do not think that that situation has either remained static or degenerated. I think it has improved.

Q Don't you believe that it is extremely important

to restore the confidence in the community with respect to your firm?

A Absolutely.

Q Had you taken any steps to try to improve public relations with the community and public understanding of what is going on at the plant prior to the Barry recommendations?

A Very definitely. In fact, I think a reading of the Barry report would show that they recognize that and they endorse what we were doing. We increased the staffing available immediately after the accident to provide information to the news media and to the public.

We also established in the GPU Nuclear Corporationn plans the element of a full-time communications department for the nuclear corporation headed by a very experienced professional in that area, which we in fact filled with a person of that quality and capability.

We have undertaken to systematically provide information to the public through media briefings, media tours, press releases, public briefings, spokesmen for public organizations, and by providing tours of the facility to members of the public to increase our communications with them and their understanding of what we are doing, what our problems are and how we are trying to address them.

So that we have seen that as an extremely

important thing and one where we have been very aggressive in increasing our level of effort in our public communications.

Q Can you assess the viability of the Citizens Advisory Committee Concept as opposed to an alternative means of providing direct means of commmunication between the utility and the public, and that would include information flowing in both directions.

A I do not see it as an alternative to communications with the public, from us to the public. I think that it may enhance considerably the ability of members of the public to provide input to the company. I think that is, you know, a fairly difficult thing for a member of the public to do now or to understand how they can do now in a very effective way, and I think that a Citizens Advisory Committee would substantially reduce that difficulty, or at least the perceived difficulty.

So that I do not see it as an alternative. I really see it as an augmentation and as complementary to the other activities we undertake.

Q But as of now you have no firm plans to establish citizen advisory committees pending further review.

A We have an internal commitment to do it. We do not have the schedule right now. And part of the delay has been because there have been a couple of things which have

happened which we think impact on both the way we may find out effective to put together such a committee, and also as to what the perceptions of us doing that might be.

One has been the naming by the Mayor of Middletown of a citizens committee which -- for that borough it is performing much of the same functions. We are also a member of this committee and we meet on a monthly basis to work with that group. And we did want to see just how that tended to develop and how effective it seemed to be.

The other is about the same time as the Theodore Barry Associates recommendation was made public, the Nuclear Regulatory Commission decided to form their advisory panel, I believe it is called, on the decontamination of TMI Unit Number 2, and I think we ran a high risk of appearing to try to be competing with that or to have confusion in the public's mind as to what the roles of the two different groups would be if we were, kind of on the heels of naming that committee, setting up a different committee which would appear to have many and would, in fact, have many of the same kinds of interactions with the company, although one is obviously advisory to the Nuclear Regulatory Commission while the other is advisory to the company.

So we sort of waited to get some time span in which the Three Mile Island Unit 2 Decontamination Advisory Panel could start to function, start to be recognized for

the role that it would have in the public's mind before we threw another group up, so to speak.

CHAIRMAN SMITH: How long is this line going to continue?

MR. ADLER: It is finished. We have no further questions.

CHAIRMAN SMITH: Any further questions of Mr. Arnold?

(No response.)

CHAIRMAN SMITH: Thank you, Mr. Arnold.

MR. BLAKE: Mr. Smith, we will need to return after lunch and react to the one outstanding Board question.

CHAIRMAN SMITH: I am aware that that is outstanding. All right.

MR. BLAKE: If it is not after lunch, we can do it another time, but there is that one area that is outstanding.

CHAIRMAN SMITH: All right. Let's return at 1 o'clock.

(Whereupon, at 12:02 p.m., the hearing was recessed, to reconvene at 1:00 p.m. the same day.)

AFTERNOON SESSION

(12:55 p.m.)

CHAIRMAN SMITH: Are we ready?

MR. BLAKE: Mr. Smith, over the lunch hour we considered the Board's question, and I would like to have Mr. Arnold respond to it now. I think he can react to the Board's area of inquiry. I think what he can provide will be of probative value to the Board, and at the same time we will respect the sensitivities of particular names of individuals who are involved.

So I would like to ask Mr. Arnold to address the Board's concern now, and I hope that it will be totally responsive and address the area of inquiry by the Board. To the extent it is not --

CHAIRMAN SMITH: Our interest in the general management response to what may have been a problem, if cross examination should go in the direction where in the view of the Board it might create problems, then we will look to other mechanisms to solve it; but let's wait until that comes up.

MR. BLAKE: That is really what I was hopeful would occur.

Whereupon,

ROBERT C. ARNOLD

resumed the stand and was further examined and testified as

follows:

BOARD EXAMINATION - Resumed

BY CHAIRMAN SMITH:

Q Mr. Arnold.

A Mr. Chairman, the company had tremendous concerns about the cause of the accident. We felt it was absolutely essential that we understood the accident just as thoroughly as we could; and that understanding obviously had to include the performance of the organization and the individuals within the organization, as well as hardware issues and other issues.

We conducted extensive investigations into the accident. We included in those investigations, I think, sufficient scope such that the performance of the people involved during the accident was able to be assessed. We did not take the approach of looking at a particular individual and trying to trace through how that individual may have responded throughout the -- from the time of the accident onward, specifically for judging did he do the right thing or did he do the wrong thing.

But I think that that information or the basis for making those judgments was clearly developed in the way in which we did the investigation. As I see it, or more than that, as I have viewed the management process about which you are inquiring now, I concluded that there were three

elements important to making the judgment on the utilization of people who were with the organization prior to the accident and in the organization subsequent to the accident.

Those three elements were: how did the individual actually perform relative to his responsibilities at the time of the accident and in the first few days, I think it would be fair to say, following the event itself. The second was what did we learn about the performance of individuals in the time period before the accident as to how the facility was being supervised, administered and managed. And the third element relates to the last series of questions that I had from the Commonwealth, and that was what were the interests of the external organizations, the surrounding communities in particular, and how did their perception of what happened during the accident and the need for them to view the organization that operated TMI-1, again with the credibility effect on those judgments.

So those, as I see it and have seen it, are the three elements that have to be looked at in making those evaluations.

In terms of the members of the organization which in fact judgments have been made vis-a-vis those three elements, they start with the licensed personnel in the control room at the time of the event. They go up through the operating organization supervisory and management

chain. They include the other management positions which I would describe as department head positions and above that were part of the station staff at the time of the accident. They include offsite people who had positions of management responsibility with regard to that station, both within Metropolitan Edison Company and within the service corporation.

And so I think in terms of the offsite people it includes the positions, the manager of operations on the corporate staff, Mr. Herbein -- including Mr. Herbein, the president of Met Ed. It included myself in the service corporation, Mr. Dieckamp and Mr. Koons.

I cannot speak with regard to judgments that were made about myself or about those in the organization senior to myself; but I can speak with respect to judgments that were made about all of those who are in the organization that is under my direction.

Q Today?

A Today. And I guess some that are no longer within the organization or would be candidates for being in the organization today as well. I guess I would include that.

And based upon the review which I personally made and the judgments that I made, none of which have been changed or overruled in any way by the people I report to, there were a number of reassignments made; there were a

number of instances where people who were considered for more responsible positions within the nuclear corporation organization were not put into those positions because of considerations of one or more of those three elements. And we had at least one individual who was offered a position within the organization which he found unacceptable and chose to leave.

I think it is fair to say that in all except a couple of cases the judgments were based upon other than the first element. These things sometimes become somewhat complex and interrelated, and perhaps it is difficult to make the distinctions completely.

But I think in terms of my judgment as to whether people at the time of the accident fulfilled their responsibilities in the way in which we could have expected them to under the circumstances, which is a tough judgment to make, I think, compared with what we would like, many of us, to have done.

There are two, I think, that the actions that I took -- were reflected in the actions I took, were based upon a significant contribution from that element.

Q I am sorry. I did not catch your very last sentence. I did not catch the import of that.

A Okay. That there were only two, I think, judgments that I made about the appropriate assignment of

individuals where that judgment was strongly or substantially predicated upon the first element, that of how they performed at the time of the accident.

And I would say this, that with regard to the assignment of people within the GPU Nuclear Corporation organization now, I have complete confidence in the availability and the willingness and the dedication of people in all of our management assignments to fulfill their responsibilities.

Q Can you give us some idea, without risk of identifying the people, approximately what level of responsibility the two persons that were reassigned or action taken based upon the first criterion?

A One has left the company, and the other is in a staff position that does not have direct responsibility for supervision of operations.

Q But they were at management level.

A Yes. I would consider them at management level.

Q My question --

A Excuse me. One of them was at the time of the accident in a very clearcut management position.

Q My question really had two purposes, and you have touched upon both purposes. The first purpose is obvious. As I stated, the Board would like to know how effective or how strong the management was in appraising performance and

making sure that the surviving organization took advantage of your experience.

But you also identified the second one, and that is, have you lost talent because of the third consideration; and that is, which I infer to be a need perhaps to impress the public and perhaps this Board -- I do not know -- that there are changes.

Have you made changes solely for the purpose of making changes, thereby losing valuable talent for the reasons that you mentioned, and that the public might feel more confident in a different organization, or this Board might, or the Commission might?

A Mr. Chairman, I personally, and I think the organization has tried very hard not to make changes for the sake of changes. And we have not lost resources which we believe we should retain or have believed we should retain as a result of what we have done, to my knowledge.

Certainly those which -- about which specific judgments were made are still with us and in what I consider to be appropriate positions. But I think it is clear that for some of us the public's confidence in our ability to perform influences our ability to perform all of the responsibilities which we hold in a management position; and one cannot discount that factor in making the judgments.

It is not only upon operational and technical

considerations that appropriateness of assignment within the organization and significant mangement positions are predicated.

Q Does this mean that where you made reassignments primarily as a consideration of public acceptance of your new organization that you have found a place for those reassigned equally useful?

A Yes. I think that is my judgment, that an equally appropriate and constructive, contributing assignment that is commensurate with the individual's demonstrated capabilities and experience.

Q And that is in the nuclear area, too?

A Yes.

Q I mean, has the nuclear area lost any talent because of that consideration?

A No, sir, not unless there was somebody -- some of those that have left us that left because of judgments I have made; and I was not aware, you know, that that was a factor in their decision, but not to my knowledge.

Q Do you -- this is a question that would be very hard for you to answer negatively -- but do you have assurance that this Board can be objective enough not to necessarily demand a whole new cast of players in our consideration of management?

A Absolutely. I think that what we have tried very

hard to do is to not only bring before this Board but bring before our own management an assembly of people to staff a logical and viable organization for conducting our nuclear activities in which we can, without reservation, identify the appropriateness of the assignment of the people within positions in the organization.

And I have no reservations about this Board or about the people in the surrounding communities being able to examine the qualifications, experience of the people we have, and agreeing that they are good, solid, capable people who are being utilized appropriately. And we have not made any of our assignments for the impact it might have before this Board.

Q You mentioned reassignments in consideration of events before the accident. Let's see if I am correct in my memory. There have been two persons reassigned because of considerations of performance in the events immediately following the accident. There have been some reassignments based upon considerations of the events leading up to the accident.

Is that a correct inference from your testimony?

A Yes. I think that we learned a lot that we previously did not either appreciate or had visibility to as to the way business was being conducted at the plant, that fell short of our expectations in certain areas.

And that while we do not believe that those contributed to the accident, they clearly reduced the level of safety of operations in a way which we were not satisfied with. And I think, you know, the people at the plant, they certainly were not satisfied with many of the issues they were struggling with.

But I think the effectiveness of the organization that was constituted to deal with those problems came under a great deal of scrutiny, and in the course of making the assignments within the organization as we developed it for subsequent operations, the effectiveness of individuals in being able to deal with those problems prior to the accident was a consideration in their assignment in the new organization.

(Board conferring.)

Q I just have one final clarifying question. When you refer to reassignments, I would assume that that is reassignments which may be into a lower position or less sensitive position or out of the line of responsibility or the action line, as well as perhaps promotions.

Could you categorize those?

A I think that -- let me say first of all when I talk about reassignments, I think it is the new organization which has some fairly obvious counterparts with the former organization, and in the sense all of us have been

reassigned.

What I was trying to do perhaps without specificity is identify in some cases the natural candidate or the obvious candidate for the restructured organization in a particular position was not given that assignment. I do not think there was anybody who I would consider to have been given what would be thought of as a promotion, although in some cases it is sort of hard to make the distinction because the jobs have changed substantially in our perception of them since the accident compared with prior to the accident.

There were clearly a couple of -- perhaps three cases where the assigned responsibilities were clearly lesser in scope and were deliberately so.

Q What was the last one?

A And were deliberately so.

Q I see. Just another question I noticed. Very often you speak in your testimony and other testimonies that several functions have been narrowed; and I understand, I believe, in the context of the testimony they have been narrowed in the sense that they have been relieved of distracting responsibilities.

A That very much so, but also that the main -- the major responsibilities of the jobs we have tried to reduce to a scope that could be reliably addressed in detail on a

day-to-day basis; so that I think an example in the radiological controls area where we split the radiological controls program from the chemistry program. Before they were basically within the same department in the station organization, and we have split those responsibilities so that the radiological -- the manager of radiological controls for Unit 1 has responsibility just for radiological controls, not radiological controls and chemistry.

And I see that as a narrowing of the scope of the job. And it is not that chemistry is a distraction to him, but chemistry in its own right we have decided to provide a greater management emphasis on than that particular department head would be able to provide.

Q But frequently in organizations when an individual's responsibilities have been narrowed rather than broadened, it is a suggestion that that person has lost authority, lost position in the hierarchy. And when I look at, for example, when I try to compare what you have done before and what you are doing now, you call it a narrowing, but I see your overall job as having been increased in responsibility.

A Yes. And I guess the distinction I would make is more one of the diversity of the activities than the magnitude of responsibility. So that when we say we have narrowed it, we have provided under a particular management

position, and I think if we referred back to the colored chart that I used yesterday that I really did not classify my job as being a narrowing but a redirection.

But, for example, Mr. Herbein as the Vice President of Generation for Met Ed where he had responsibility for all the fossil plant operations, we have narrowed the diversity or reduced the diversity of his job or the job that he is assigned to now from the diversity that existed in the previous one.

I guess that I would not think that there is a significantly less job content under the new awareness we have now to heading up the nuclear assurance for all of our nuclear activities with that of heading up Met Ed's fossil and nuclear operations.

It is a tough comparison I think to make. Certainly I think they are essentially equivalent in substance of the job, management challenge, and certainly contribution to safety.

Q All right. Then one of the mandatory issues that we must address and there will be testimony on is management response to the accident. We will be considering that.

But along the line of the other comment I made, I want to assure you and the officials here that when we relate the officials of GPU Nuclear to the accident that we will take all of the time necessary and all the attention

necessary to assure a full, objective record.

The point I am trying to make here is we wish to set the scene where your organization has the advantage of the best people without regard to what the perception of their role may have been during the accident.

A I appreciate those comments very much, Mr. Chairman, and I think that clearly the company speaking for itself and sort of bootstrapping up its own credibility is a problem; and I think that not only we but others will benefit very much from that approach by the Board.

CHAIRMAN SMITH: Mr. Adler.

MR. ADLER: I have no questions.

CHAIRMAN SMITH: Mr. Swanson.

MR. SWANSON: No questions.

BY DR. JORDAN:

Q There was, of course, an accident or an incident at Davis-Besse. This has been described as a precursor to the TMI-2 accident, and the question has been raised many times as to why is it that the operating crew at the Davis-Besse plant were able to respond properly and contain the incident, whereas those at the TMI-2 took some obviously wrong actions.

Now, have you considered this and reached any judgment as to why it is that the TMI-2 operators did not respond as well as the Davis-Besse, or do you disagree with

the characterization?

CHAIRMAN SMITH: Before you answer, I want to have a short conference with Dr. Jordan.

(Board conferring.)

CHAIRMAN SMITH: All right. Before Dr. Jordan asked that question I was aware he had it on the list of questions to ask, and the timing of the question immediately following the questions I asked is simply chance, coincidental.

THE WITNESS: Thank you for the clarification, sir.

I have not found -- and I guess I cannot state that I do not think it exists, because there is a lot of things about the Davis-Besse accident I have not had the opportunity to read or have not taken the opportunity to read -- but I have not found a satisfactory answer to that in my own mind.

I think the two elements of the incident at Davis-Besse that were different, that may be substantive contributors to the different response, is first of all they were at relatively low power level, I believe about nine percent, and things just happened a lot more slowly. There was not nearly so much going on within the plant, so there is not so much diversity of response in the plant.

The other is it is my understanding that the Davis-Besse relief valve cycled several times -- in fact, I

think the count I heard was like nine times -- prior to failing in the open position.

I do not know, but it certainly would not seem unreasonable to me that that attracted their attention to that in a way that the failure of our valve to reclose following an expected opening of the valve may not have keyed our people in. But I have to confess I do not have a satisfactory judgment in my own mind as to why the difference.

DR. JORDAN: That is fine.

(Board conferring.)

CHAIRMAN SMITH: Anything further?

(No response.)

CHAIRMAN SMITH: All right. Thank you, sir.

(The witness was excused.)

MR. BLAKE: Mr. Chairman, I now call on Mr. Hukill, Mr. Ross, and Mr. Toole. The three of these gentlemen have been sworn. Mr. Hukill has not appeared before.

Whereupon,

RONALD J. TOOLE
MICHAEL J. ROSS
JOSEPH J. COLITZ

recalled as witnesses by counsel for the Licensee, Metropolitan Edison Company, having previously been duly sworn by the Chairman, were further examined and testified as follows:

Whereupon,

HENRY D. HUKILL

called as a witness by counsel for the Licensee, Metropolitan Edison Company, having first been duly sworn by the Chairman, was examined and testified as follows:

EXAMINATION

BY MR. BLAKE:

Q Let me first ask each of you gentlemen to provide your name and address, starting from my right.

A (WITNESS TOOLE) My name is Ronald Joseph Toole. And my address is TMI Nuclear Station.

A (WITNESS HUKILL) My name is Henry D. Hukill. My address is TMI Nuclear Station.

A (WITNESS ROSS) My name is Michael J. Ross. My business address is TMI Nuclear Station.

A (WITNESS COLITZ) My name is Joseph J. Colitz. My address is the TMI Nuclear Station.

Q Now, for the identification on the record and the use of the parties, would you provide your current title, Mr. Toole?

A (WITNESS TOOLE) I am the operations and maintenance director of the TMI-1.

Q Mr. Hukill?

A (WITNESS HUKILL) I am the vice president of TMI-1.

A (WITNESS ROSS) I am the manager of plant operations, TMI Unit 1.

Q Mr. Colitz?

A (WITNESS COLITZ) Plant engineering director, TMI-1.

Q And were those titles that you have just given the titles that you hold, as you understand it, within the GPU Nuclear Corporation and, as far as you know, from here on out, there are no anticipated title changes?

A (WITNESS HUKILL) These are the titles that are now appropriate for the GPU Nuclear organization which just recently changed these titles.

Q Gentlemen, I show you a copy of a document dated

LIC-12/22/80, which bears the title "Licensee's Testimony of Henry D. Hukill, Ronald J. Toole, Michael J. Ross, and Joseph J. Colitz Regarding CLI-80-5, Issues (2) 5 ANGRY Contention Number IV, and Sholly Contention Number 14(A)(B) and (E) (TMI-1 Unit Organization and Technical Resources."

Was this document prepared by you gentlemen or under your direct supervision?

A (WITNESS TOOLE) Yes, it is.

Q And by your response, Mr. Toole, Mr. Hukill, Mr. Ross, Mr. Colitz, do you have the same answers?

A (WITNESS HUKILL) Yes, it is.

A (WITNESS ROSS) It is.

A (WITNESS COLITZ) Yes.

Q And are there any corrections which we -- ought to be made to this paper at this point in time?

A (WITNESS HUKILL) Yes. There is one small typographical error on page 16. The last word, first paragraph at the top of the page, should be "license" and not "licensee." Just delete the "e" on the end of "licensee."

Q Gentlemen, with that correction, do each of you adopt this testimony and within it those portions which describe your qualifications in the case of Mr. Hukill on page 5, in the case of Mr. Toole on page 9, in the case of Mr. Ross on page 12, in the case of Mr. Colitz on page 41?

Do you adopt this as your testimony in this proceeding, including your respective qualifications?

A (WITNESS TOOLE) Yes, I do.

A (WITNESS HUKILL) Yes, I do.

A (WITNESS ROSS) I do.

A (WITNESS COLITZ) I do.

MR. BLAKE: I should note for the Board and the benefit of the parties that the testimony has been subdivided by individual sponsors from this panel.

BY MR. BLAKE: (Resuming)

Q Gentlemen, I now show you two more pieces of paper, one which bears simply the title "On-Site Organization." It has a legend in the upper left-hand corner, a block showing education and license qualification, and a "C" indicating designation of college.

The second one-page document is entitled "Change in Titles of TMI-1 Staff." And neither of the documents bears the title -- Mr. Hukill, can you identify this first document entitled "On-Site Organization" as a correct indication of the organization under you for TMI-1, insofar as it describes that organization?

A (WITNESS HUKILL) Yes, I can.

Q And can you also identify whether or not this same on-site organization chart appears in our recent amendment to the NRC for the GPU Nuclear Corporation?

A (WITNESS HUKILL) Yes, I can. I cannot verify that it was identical, but it is the same organization chart that I remember seeing going into the license amendment.

MR. BLAKE: I can represent to the Board that it is identical with the exception of the figure "61A." I believe that designation was deleted from the upper right-hand corner of it.

BY MR. BLAKE: (Resuming)

Q With respect to the second document, Mr. Hukill, "Change in Titles of TMI-1 Staff," was this document prepared by you or under your supervision?

A (WITNESS HUKILL) Yes, this document was personally prepared by me.

Q And in your view, it is an accurate representation of titles shown throughout your prefiled testimony and as well the new proposed titles which each of you has used today?

A (WITNESS HUKILL) Yes, it does.

Q And do you adopt these two documents as supplemental testimony in this proceeding?

A (WITNESS HUKILL) Yes.

MR. BLAKE: Mr. Chairman, I would ask that the document which is the prefiled prepared written testimony of this panel of witnesses and the two individual documents, the Unit 1 site organization chart and the change in titles

of TMI-1 staff document, all be specifically incorporated into the record as the testimony of these witnesses at this point in the transcript.

CHAIRMAN SMITH: If there are no objections, the supplemental testimony and the testimony is received.

(The documents referred to, the prefiled written testimony of the panel and the charts titled "On-Site Organization" and "Change in Titles of TMI-1 Staff," follow.)

LIC 12/22/80

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289 SP
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	
	)	

LICENSEE'S TESTIMONY OF

HENRY D. HUKILL, RONALD J. TOOLE,

MICHAEL J. ROSS, AND JOSEPH J. COLITZ

REGARDING CLI-80-5, ISSUES (2) AND (5),

ANGRY CONTENTION NO. IV, AND

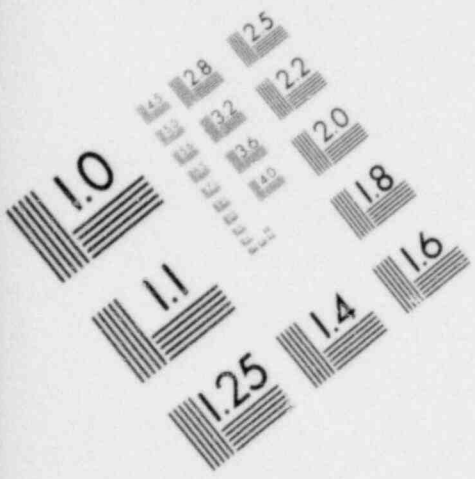
SHOLLY CONTENTION NO. 14(a), (b), AND (e)

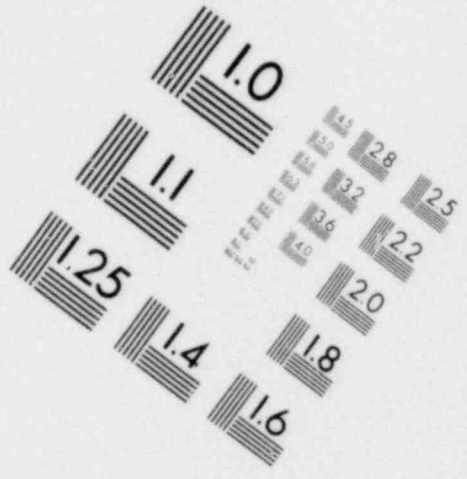
(TMI-1 UNIT ORGANIZATION

AND TECHNICAL RESOURCES)

OUTLINE

The purposes and objectives of this testimony are to respond to Issues (2) and (5) of Commission Order CLI-80-5, ANGRY Contention IV, and Sholly Contention 14(a), (b), and (e) insofar as they challenge the sufficiency of management commitment and technical resources devoted to the daily operation and maintenance of TMI-1. The testimony shows that the TMI-1 unit organization has been significantly modified since the accident at TMI-2. The TMI-1 unit organization is now separate from TMI-2. Emphasis has been placed upon availability of full-time technical and management staff to operate, maintain and manage TMI-1 activities under normal and abnormal operating conditions. The TMI-1 staff has been markedly increased in number, as well as depth of technical expertise. New personnel with extensive nuclear reactor experience have been brought into the unit organization. Concomitantly, Licensee has reduced the scope of responsibility previously assigned to TMI-1 management and plant staff. As a result, station staff and supervisory personnel are able to focus fully on the facility's operation and maintenance; TMI-2 cleanup and other Licensee activities do not detract from this focus.





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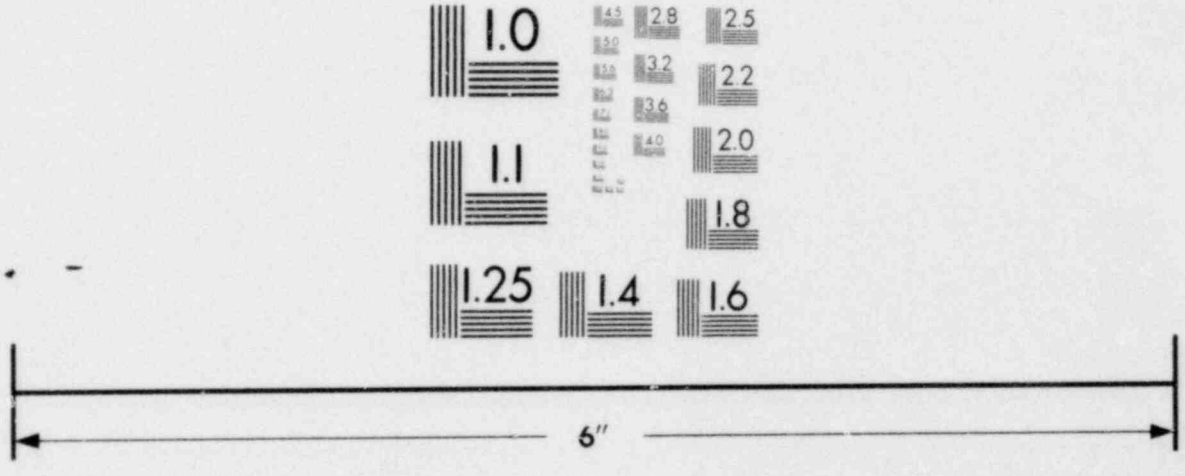

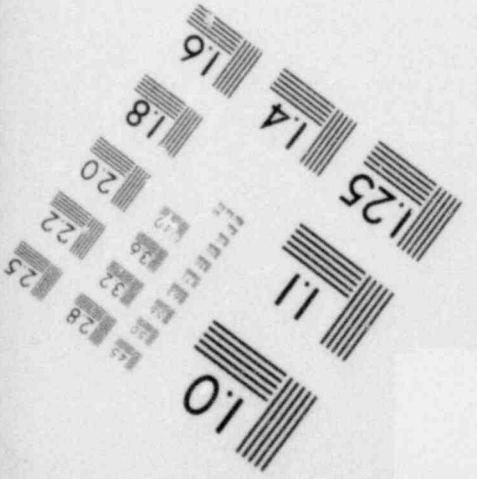

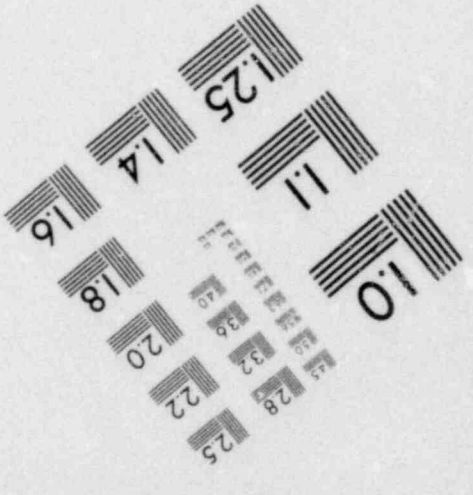

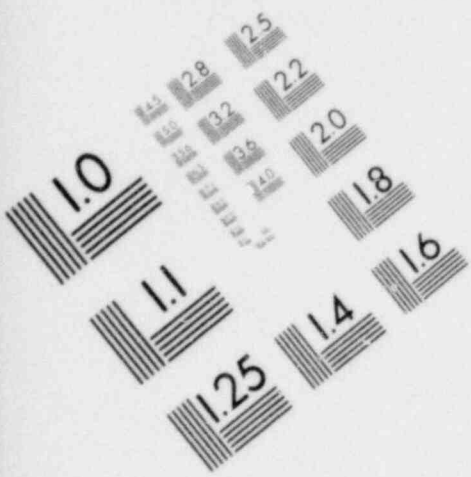

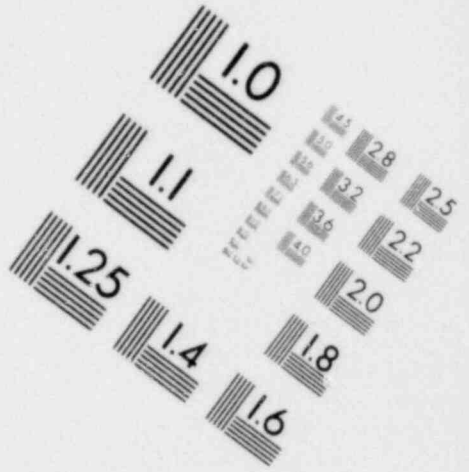

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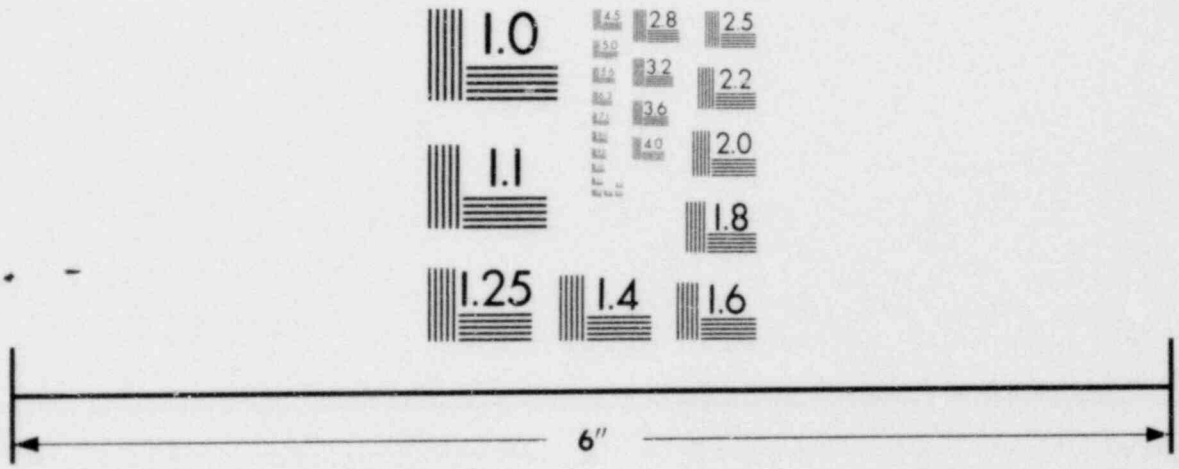
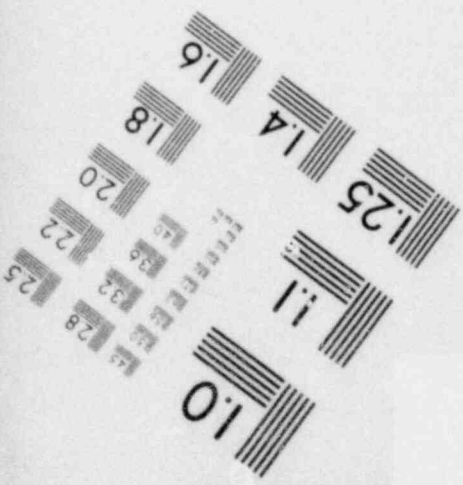
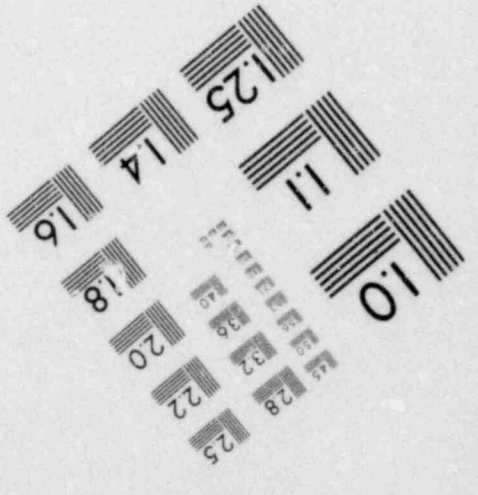






INDEX

BY WITNESSES HUKILL, TOOLE, ROSS AND COLITZ

This testimony, by Henry D. Hukill, Vice-President of TMI-1, Ronald J. Toole, Manager of TMI-1, Michael J. Ross, Supervisor of Operations, TMI-1, and Joseph J. Colitz, Manager of Plant Engineering, TMI-1, is addressed to the following questions and contentions:

CLI-80-5, ISSUE (2)

> Whether the operations and technical staff of Unit 1 is qualified to operate Unit 1 safely (the adequacy of the facility's maintenance program should be among the matters considered by the Board).

CLI-80-5, ISSUE (5)

> Whether the Unit 1 Radiation Waste System is appropriately staffed with qualified individuals to ensure the safe operation of the facility.

ANGRY CONTENTION NO. IV

> The Licensee lacks the management capability to operate a Nuclear Generating Station without endangering the public health and safety.

SHOLLY CONTENTION NO. 14(a) (b) AND (e)

> The Licensee's management capability, in terms of organizational, staffing, and technical capabilities, is not sufficient. Specifically, the following deficiencies in Licensee's management capability are contended:

(a) Licensee's administrative structure, both at the plant and corporate levels, is not appropriately organized so as to assure safe operation of TMI-1 while conducting cleanup operations at TMI-2.

(b) Licensee's operations and technical staffs are not sufficiently qualified to safely operate TMI-1.

. . .

(e) Licensee's maintenance program is insufficiently staffed and inappropriately organized for the purpose of safely operating TMI-1.

BY WITNESSES HUKILL AND TOOLE

The TMI-1 unit organization includes a full-time staff of approximately 322. Since the TMI-2 accident, Licensee has devoted substantial time and effort to its reorganization and strengthening of Unit 1 staff, including: isolating the management and technical support of TMI-1 from TMI-2 activities; significantly reducing the responsibilities of lead TMI-1 management in order to allow these individuals to devote their full attention to Unit 1's safe and efficient operation and maintenance; and restructuring the TMI-1 organization so that effective control over important unit activities and decisions is maintained by TMI-1 management. The TMI-1 organization is described in detail in Section 5 of the TMI-1 Restart Report.

The job of reorganizing and strengthening the Unit 1 staff has involved a number of separate efforts. New

personnel, particularly in the top levels of management both at TMI-1 and in the support divisions, have been recruited by Licensee from outside of the GPU organizations. In addition, personnel previously assigned to other GPU activities have been brought to TMI-1 and permanently assigned to the unit. Licensee has also restructured the TMI-1 organization, with emphasis upon on-site technical support and management control. At the same time, direct channels of communication have been developed between on-site technical and management personnel and off-site support organizations, such as Radiological and Environmental Controls, Technical Functions and Nuclear Assurance. In this manner, the unit staff can rapidly and effectively make use of the extensive technical support staff available to it from other elements of the GPU Nuclear Corporation.

With respect to personnel qualifications and training, whenever applicable, Licensee's TMI-1 employees meet the qualifications and requirements set forth in NRC's Regulatory Guide 1.8 (May 1977), entitled, "Personnel Selection and Training," and ANSI/ANS 3.1 (1978), "The American National Standard for Selection and Training of Nuclear Power Plant Personnel." At the same time, in its pursuit of top notch staff for the unit, and in anticipation of forthcoming changes in these industry criteria, Licensee has sought personnel with credentials significantly in excess of these requirements.

Licensee has also reconstituted and expanded its TMI-1 training program. The training program is described in the testimony of Dr. Robert R. Long et al.

BY WITNESS HUKILL

The Vice-President of TMI-1 is the senior member of management within the TMI-1 unit organization. The Vice-President of TMI-1 is located full-time on site. He reports to the Office of the President of GPU Nuclear Corporation, located in Parsippany, New Jersey. The primary job of the Vice-President of TMI-1 is to ensure that in all respects the facility is being operated and maintained safely, in accordance with the plant's Technical Specifications, as well as other applicable criteria. The Vice-President of TMI-1 has been delegated absolutely minimum responsibilities not directly associated with the operation and maintenance of Unit 1 so that he may devote his full time and attention to management of TMI-1 operations. His responsibilities include assuring the adequacy of his staff's procedures and practices, and of performance and training of all unit personnel. On a daily basis, the Vice-President of TMI-1 oversees the plant's operation, and evaluates, institutes, and modifies policies affecting activities at Unit 1. In addition, he implements those policies and procedures of GPU Nuclear Corporation applicable to TMI-1.

The Vice-President of TMI-1 is the senior TMI-1 liason with the engineering, design and analysis, nuclear assurance (which includes training and emergency preparedness), maintenance and construction, radiological and environmental controls and administrative services available to the facility from the GPU Nuclear Corporation. In this capacity, it is the responsibility of the Vice-President of TMI-1 to ensure coordination of the services provided by the other GPU Nuclear Corporation divisions whenever such services are in the interest of the health and safety of either the public or personnel at TMI, or to improve plant reliability and efficiency.

The Vice-President of TMI-1 has the authority to shut and cool down TMI-1 whenever it is appropriate to do so, whether in the interest of health and safety, or because in his judgment such action is otherwise warranted. In connection with his responsibility for ensuring that the unit organization functions effectively during an emergency, the Vice-President of TMI-1 coordinates with the Vice President-Nuclear Assurance in scheduling, instituting and evaluating the unit's response to emergency drills and training.

The Vice-President of TMI-1 is Henry D. Hukill. Mr. Hukill joined GPU as the Prospective Director, TMI-1 in June 1980, and formally began serving as Director on September 8, 1980. Mr. Hukill received a Bachelor of Science degree from

the U.S. Naval Academy in 1953, and served on active duty in the U.S. Navy for more than 22 years. His naval assignments primarily involved the construction, maintenance and operation of nuclear submarines, including completion of one year of naval nuclear power training resulting in qu lification as a Chief Operator of the S-3-G landbased prototype reactor plant; tours as Division Officer for the Reactor Control, Mechanical, and Electrical divisions aboard a nuclear submarine; a tour as Chief Engineer; and five years in command of a nuclear submarine which encompassed a reactor refueling and major overhaul. During his last four years on active duty Mr. Hukill was assigned as a Special Assistant and Senior Line Officer on the Staff, Director, Division of Naval Reactors, Department of Energy. In this capacity he was directly responsible for the selection and engineering training of all nuclear ship Commanding Officers. He was also directly involved in the establishment and enforcement of standards and procedures for the safe and proper operation of all naval nuclear propulsion plants. During his four years with the Director, Division of Naval Reactors, Mr. Hukill gained extensive insight into the procedures, methods and requirements developed by the Director for insuring the safe and reliable design, operation, and maintenance of the Navy's nuclear propulsion plants. Based on firsthand observation and participation, Mr. Hukill is implementing at TMI-1 a very vigorous and disciplined approach to

nuclear power plant operation, including strong and direct leadership from the top for all matters related to the design, engineering, maintenance and operation of nuclear power plants. In Mr. Hukill's judgment, such leadership is absolutely essential if one is to achieve the high standards of performance required. The insight and experience Mr. Hukill acquired while working for the Director, Division of Naval Reactors, will be invaluable in carrying out his present responsibility for restarting and operating TMI-1 in a safe, reliable and professional manner. Mr. Hukill has also gained valuable experience from his tenures as the Project Operations Manager, Clinch River Breeder Reactor Plant Project for Burns and Roe, Inc. (January, 1976 to February, 1977) and as a Senior Civilian Special Assistant to the Commander, Naval Sea Systems Command (February, 1977 to May, 1980). In the latter capacity, Mr. Hukill was responsible for all matters related to the selection, education, qualification, training and professional performance of the Navy's more than 1200 Engineering Duty Officers.

Reporting directly to the Vice-President of TMI-1 are the following Managers, who have primary responsibility for Unit 1's daily operational, maintenance, engineering and in-house administrative activities: (1) R. J. Toole, Manager, TMI-1; (2) J. J. Colitz, Manager, Plant Engineering; and (3) P. G. Christman, Manager, Administration.

BY WITNESSES HUKILL AND TOOLE

The Manager of TMI-1 is responsible for the day-to-day operation and maintenance of the facility. The Manager directs the activities associated with on-going operation of TMI-1. Essentially, it is the Manager's job to see to it that any and all operational problems which arise while the plant is operating or during an outage are properly diagnosed, so that appropriate action can be taken. It is also the responsibility of the TMI-1 Manager to effectively coordinate the activities of the Operations and Maintenance Departments and, in particular, to ensure that Maintenance personnel are responsive to the needs of Operations. The TMI-1 Manager has the authority to order the unit shut and cooled down whenever it is in the interest of the public health and safety to do so, or whenever in his judgment such action is otherwise warranted.

While the Manager relies first upon the staff of approximately 260 under his supervision to operate and maintain the unit, he also utilizes, as appropriate, the technical resources from other Unit 1 and GPU Nuclear organizations. For example, the Unit 1 Manager may ask the Manager of Plant Engineering to evaluate equipment performance and when required recommend appropriate preventive or corrective maintenance actions. If an unresolved issue arises between Managers within

Unit 1, the matter is referred for resolution to the Vice-President of TMI-1. In the event that it becomes evident that the problem requires a good deal of technical analysis, or involves an extended number of manhours of maintenance work, the Manager of Unit 1 can request the assistance of the Technical Functions and/or Maintenance and Construction branches of the GPU Nuclear Corporation.

As a result of the organizational changes instituted by Licensee since the TMI-2 accident on March 28, 1979, the responsibilities of the Manager of TMI-1 have significantly decreased in scope. The Manager is no longer responsible for the unit's engineering, radiation protection, water chemistry, and administrative activities. Instead, the Manager can focus his attention on plant operations, and on the facility's preventive and corrective maintenance programs.

The current Manager of TMI-1, Mr. Ronald J. Toole, assumed his responsibilities as Manager in February of this year. Mr. Toole has diversified power plant experience, having worked in both nuclear and coal facilities. Moreover, Mr. Toole has previously served in management and engineering staff positions.

Immediately prior to joining TMI-1, Mr. Toole was the Unit Superintendent in charge of two 650 MWe coal fire plants located at Pennsylvania Electric Company's Homer City Station. In this capacity, he was responsible for all engineering,

maintenance and operational activities at the facility. Before going to Homer City Station, Mr. Toole was employed at TMI Unit 2 for over four years (September, 1974 until December, 1978) as the Test Superintendent responsible for construction, pre-operational and power escalation testing. From January, 1971 until September, 1974, Mr. Toole was the Assistant Test Superintendent for GPU at TMI Unit 1. As the Assistant Test Superintendent, he developed the schedule that was used in the testing and start-up program, beginning with energizing the auxiliary transformers through the initiation of commercial operation. During this period of time, Mr. Toole also worked for six weeks at the GPU Oyster Creek nuclear facility as the Refueling Supervisor, directing the operations and maintenance personnel in the performance of the first Oyster Creek refueling. In addition, Mr. Toole served as the Shift Test Director during the TMI-1 low power physics and power escalation programs. From February, 1968 until December, 1970, Mr. Toole worked for GPU as a shift test engineer at the Oyster Creek nuclear facility. During this period of time, he obtained a reactor operator's license (1969), and a senior reactor operator's license (1970). Mr. Toole began his career in 1966 working as a construction engineer for Pacific Gas and Electric Company, after receiving a Bachelor of Science degree in electrical engineering from the Newark College of Engineering. As a construction engineer, Mr. Toole supervised

the installation of the electrical switchgear and power train system in the Moss Landing Generating Station.

BY WITNESSES HUKILL, TOOLE AND ROSS

Reporting to the Manager of TMI-1 is the Supervisor of Operations. The responsibilities of the Supervisor of Operations encompass all aspects of facility operation, including maintaining TMI-1 in compliance with its operating license. On a daily basis, the Supervisor of Operations reviews and schedules all routine and nonroutine operations; is in charge of requesting operations-related maintenance work from the Maintenance Department; reviews and writes operating procedures; and is available to consult with his staff of approximately one hundred with respect to plant operations.

The Supervisor of Operations has no responsibilities that do not directly affect the daily operation of TMI-1. In the event of a reactor-related emergency, the Supervisor of Operations is in charge of all control room activities; however, he is not responsible for any other on or off-site activities, such as radiation control or monitoring. The Supervisor of Operations has the authority to order the unit shut and cooled down whenever it is in the interest of the public health and safety to do so, or whenever in his judgment such action is otherwise warranted.

The current Supervisor of Operations is Michael J. Ross, who has served in this capacity since April of 1978. Prior to becoming Supervisor of Operations, Mr. Ross worked as a TMI-1 shift supervisor (July, 1972 to April, 1978). He was also a Unit 1 shift foreman for two years, beginning in August of 1970. Mr. Ross also was employed as a member of the Operations staff and an operator instructor at the Saxton Nuclear Experimental Corporation. From 1960 when he graduated from high school until 1968, Mr. Ross served in the Navy, during which time he attended the U.S. Navy Nuclear Power school (26 weeks in 1961) and the Nuclear Power Prototype School (26 weeks in 1961); served as a reactor operator aboard the USS HADDO for three years (1962-1965); taught reactor controls and instrumentation at a Navy's Nuclear Power Training Unit (NPTU) from 1965 to 1966, qualifying at that time as an Engineering Officer; and served as an AEC Field Representative at the NPTU from 1966 to 1968, during which time he passed the Navy's nuclear engineering examination. Mr. Ross holds a senior reactor operator license on TMI-1.

The Operations staff, under the direction of the Unit 1 Supervisor of Operations, is divided into three categories: the shift operating staff, the radwaste group, and several operations engineers. In addition, working in conjunction with the control room operating personnel are the Shift Technical Advisors (STAs) who represent Technical Functions and provide on the spot and around the clock technical advice and guidance to the plant operating staff.

The shift operating staff of Unit 1 is directly responsible for placing and maintaining the plant in a safe condition on a 24-hour basis. Operating personnel control the reactor primary and secondary systems as well as associated plant systems and equipment during normal operations and plant shut downs; in response to reactor transients; and when emergencies unrelated to the operation of the facility are experienced on site, such as fires and personnel injuries.

The shift operating staff is on a six shift rotation (one of every six weeks being totally devoted to training). The shift will be composed of six shift supervisors, six shift foremen, 18 control room operators, (at least 12 of which shall be licensed), and 36 auxiliary operators. When the reactor coolant water temperature is greater than 200°F, Licensee normally has on shift one shift supervisor who is SRO licensed, a second SRO-licensed operator who is the shift foreman, one shift technical advisor, three control room operators, at least two of which are licensed, and six auxiliary operators. About six CRO positions and six AO positions have been established as training positions to fill vacancies due to attrition. These individuals may be in the classroom receiving formal instruction or on shift receiving actual on-the-job training depending on their status in the formal training and qualification program. Shift turnover procedures have been adopted and shift recordkeeping required by Licensee to ensure that each shift is

kept fully informed of the current status of all systems important for reactor operation and safety. Prior to assuming his duties, the control room operator (CRO), for example, must review the Control Room Log and several other specified operating logs. The CRO acknowledges this review and his cognizance of current plant status by signing the Control Room Log prior to assuming the shift duty. While on shift, the CRO must maintain certain records, including the CRO Turnover Checklist and the ES Checklist, designed to summarize important, current plant conditions. He must also discuss with his oncoming relief plant status, operations in progress, and shift turnover checklists, prior to signing out. Similar shift turnover checklist procedures exist for other shift staff with responsibility for operation or maintenance of the primary or secondary plant systems, e.g., shift supervisors, shift foremen, auxiliary operators, senior radiation protection and chemistry personnel, shift maintenance foremen. Additionally, the shift supervisor at the beginning of each shift briefs his operating crew on the current plant status and scheduled events during the shift.

The shift supervisor directs activities in the control room, as necessary. This includes supervision of all plant operators and trainees. He is also in charge of other operational activities, such as requesting, approving and monitoring the progress of needed maintenance work. In

addition, it is the job of the shift supervisor to ensure that all safety-related activities are conducted in accordance with the appropriate procedures. The shift supervisor reports directly to the Supervisor of Operations. It is the responsibility of the shift supervisor to concern himself at all times with the safety of the unit. Administrative functions that detract from or are subordinate to this primary responsibility are delegated to other personnel. Prior to the TMI-2 accident, the shift supervisor split his time between the two TMI units. This is no longer true. The presence of a shift supervisor on duty at all times at TMI-1 significantly bolsters the shift operating staff by providing additional depth in available dedicated personnel.

The shift supervisor has the authority to shut and cool down the reactor if it is necessary to do so in the interest of health and safety or if, in his judgment, such action is otherwise warranted. He is also vested with the authority to change operations and maintenance work priorities, as needed. Finally, any activity on any plant system can be halted by the shift supervisor if in his judgment such action is required for the safe operation of the plant.

All six of the incumbent TMI-1 shift supervisors worked their way up the ladder of responsibility within TMI-1's shift operations department. As a result, they all have had significant "hands-on" experience, not only with a nuclear

power plant, but with the TMI-1 facility. In addition, all of the shift supervisors have received their senior reactor operator licenses.

Incumbent A served as a shift foreman at Unit 1 from October, 1976 to July, 1979, prior to becoming a shift supervisor. Incumbent A was also a control room operator at TMI-1 from October, 1969 to October, 1976. He obtained his reactor operator license in 1974, and his senior reactor operator license in 1976. Incumbent A served in the U.S. Army from 1958 to 1959. He graduated from high school in 1954.

Incumbent B also became a Unit 1 shift supervisor in July, 1979 after working as a shift foreman at Unit 1 for four years (July, 1975 to July, 1979), a control room operator at Unit 1 for two and a half years (December, 1972 to July, 1975), and an auxiliary operator at Unit 1 for over three years (October, 1969 to December, 1972). Incumbent B obtained his reactor operator license in 1974, and his senior reactor operator license in 1976. He is a high school graduate (1961).

Incumbent C has been a shift supervisor at Unit 1 since April, 1978. Prior to that time, Incumbent C was a TMI-1 shift foreman (August, 1976 to April, 1978), and a TMI-1 control room operator (October, 1968 to August, 1976). Incumbent C received his reactor operator license in 1974 and his senior reactor operator license in 1977. Upon graduation from high school in 1959, Incumbent C served in the U.S. Air Force for four years.

Before becoming a shift supervisor in May, 1976, Incumbent D worked as a Unit 1 shift foreman for two and a half years (October, 1973 to May, 1976), and as a Unit 1 auxiliary operator for one and a half years (February, 1972 to October, 1973). He received a reactor operator license in 1974, and a senior reactor operator license in 1975. Incumbent D was also a reactor operator aboard the USS BAINBRIDGE from 1969 to 1971, after attending the U.S. Navy's Basic Nuclear Power School for 26 weeks (1966 to 1967), and Naval Nuclear Power Prototype Training for 26 weeks (1967). Incumbent D graduated from high school in 1964.

Incumbent E has been a Unit 1 shift supervisor since October, 1977. He has also been a Unit 1 shift foreman (October, 1975 to October, 1977), a Unit 1 control room operator (July, 1973 to October, 1975), and a Unit 1 auxiliary operator (March, 1969 to July, 1970). Incumbent E obtained a reactor operator license in 1974, and a senior reactor operator license in 1976. He served in the U.S. Air Force from 1964 to 1969. Incumbent E is a high school graduate (1964).

Incumbent F became a shift supervisor at TMI-1 in May, 1980. Prior to this assignment, Incumbent F worked as a Unit 1 shift foreman for over two and a half years (September, 1977 to May, 1980), a Unit 1 control room operator for seven years (July, 1970 to June, 1977), and an auxiliary operator at Unit 1 for nine months (October, 1969 to July, 1970).

Incumbent F obtained his reactor operator license in 1974, and obtained his senior reactor operator license in 1977. He is a high school graduate (1957).

In contrast to the shift supervisor, the shift foreman's job is strictly limited to reactor operations. The shift foreman, who reports to the shift supervisor, oversees the activities of the control room operators and the auxiliary operators. The job of the shift foreman consists primarily of directing and assisting the operators, control room and auxiliary, whenever necessary; ensuring that all control room activities are executed in accordance with prescribed requirements, guidelines, and operating procedures; and ensuring that operators devote their full time and attention to their job which includes control panel monitoring, processing of radiation work permits (RWPs) and tagging applications, and operational log and recording functions.

The shift foreman has the authority to shut and cool down the reactor if it is necessary to do so in the interest of health and safety or if, in his judgment, such action is otherwise warranted.

Like the incumbent shift supervisors, the current shift foremen for Unit 1 have worked extensively in TMI-1 shift operations prior to assuming their present responsibilities. Each of these individuals has been both a control room operator and an auxiliary operator at Unit 1. This experience has not

only served to extend their nuclear power plant experience, but has made them familiar with the operating characteristics of TMI-1.

Incumbent A became a shift foreman in July, 1978. From June, 1975 to July, 1978, Incumbent A was a Unit 1 control room operator. From July, 1968 to June, 1975, he served as a Unit 1 auxiliary operator. Incumbent A obtained his reactor operator license in 1976, and his senior reactor operator license in 1978. Incumbent A served in the U.S. Air Force from 1963 to 1968. He is a high school graduate (1963).

Incumbent B, who was promoted to shift foreman in May, 978, worked as a Unit 1 control room operator for three years (April, 1975 to May, 1978), and as a TMI-1 auxiliary operator for over four years (February, 1971 to April, 1975). In addition, Incumbent B was an Engine Room Supervisor aboard the submarine USS THEODORE ROOSEVELT from 1968 to 1971 and a mechanical operator aboard the submarine USS WHALE in 1968. He was trained at the U.S. Navy Nuclear Power School for twenty-six weeks (1964-1965), and Nuclear Power Prototype Training for twenty-six weeks (1965). Incumbent B began his service in the U.S. Navy in 1963, upon graduation from high school. Incumbent B received his reactor operator license in 1976; his senior reactor operator license in 1978.

Incumbent C has been a Unit 1 shift foreman since July, 1978. From October, 1976 to July, 1978, he was a TMI-1 control room operator. From February, 1974 to October, 1976,

he worked as a Unit 1 auxiliary operator. Incumbent C served in the U.S. Navy from 1968 to 1974, during which time he received significant nuclear experience. After attending the U.S. Navy Nuclear Power School in 1968, and Nuclear Power Prototype Training from 1968 to 1969, he worked as an electrical system operator aboard the submarine USS SEA DEVIL from 1969 to 1972, and as a sound and vibration analyst worker aboard the submarine USS BATES from 1972 to 1974. Incumbent C obtained a reactor operator license in 1977 and a senior reactor operator license in 1978. He graduated from high school in 1966.

Incumbent D became a Unit 1 shift foreman in August of 1979 after working as a TMI-1 control room operator for approximately two years (October, 1977 to August, 1979), and as an auxiliary operator for two years (September, 1975 to October, 1977). Incumbent D obtained his reactor operator license in 1978. He is a high school graduate (1967).

Incumbent E worked on the TMI-1 shift operations staff as an auxiliary operator for two years (May, 1976 to March, 1978) and as a control room operator for over one and a half years (April, 1978 to December, 1979) prior to becoming a shift foreman at the station. He received his reactor operator license in 1979, and his senior reactor operator license in 1980. Incumbent E served in the U.S. Navy from 1970 to 1976 and, in this capacity, received additional nuclear power plant

training and experience. He attended the U.S. Navy Nuclear Power School in 1971 and Nuclear Power Prototype Training in 1972, and submarine school in 1972. From 1972 to 1976, Incumbent E served aboard the submarines USS NATHANIEL GREEN and USS PARGO. Incumbent E graduated from high school in 1969.

Incumbent F became a Unit 1 shift foreman in March, 1978. Incumbent F's experience at TMI-1 includes four years as a control room operator (February, 1974 to February, 1978), and over three and a half years as an auxiliary operator (June, 1970 to February, 1974). Incumbent F served in the U.S. Navy for seven years, from 1963 to 1970. During that time, he attended the U.S. Navy Electronics School (1963-1964), the U.S. Navy Nuclear Power School (1965), and Nuclear Power Prototype Training (1965-1966). He worked as a reactor operator aboard the submarine USS GEORGE C. MARSHALL from October, 1968 to March, 1970. He received his reactor operator license in 1974 and his senior reactor operator license in 1978.

Incumbent G became a Unit 1 Shift Foreman in October 1980. Incumbent G's experience at TMI-1 includes over three years as a Control Room Operator (May 1977 to October 1980), and over three years as an Auxiliary Operator (February 1974 to May 1977). Incumbent G served in the U.S. Navy for six years from 1968 to 1974. During that time, he attended the U.S. Navy Nuclear Power School (1968 to 1969), the U.S. Navy Nuclear Power Prototype Training (1969). He served as a Mechanical Operator on the cruiser TRUXTON from 1970 to 1972 and was an

Engineer Room Supervisor on the same ship from 1972 to 1974. He received his reactor operator license in 1978. Incumbent G graduated from high school in 196^ and graduated from Pennsylvania State University in 1966 with an Associate Degree in Drafting & Design Technology.

At Unit 1 currently there are 22 control room operators. The control room operators report to the shift foreman. It is the job of the control room operator to operate and monitor the status of the reactor, the turbine, the generator, and all of the other equipment pertinent to TMI-1 operation. A control room operator's responsibilities extend solely and entirely to ensuring the safe operation of all equipment assigned to him. If the responsibility is delegated to him by the shift foreman, his responsibilities may include directing the activities of the auxiliary operators on duty, and ensuring that the auxiliary operators perform their assigned jobs in accordance with the appropriate procedures. The control room operator immediately reports to the shift foreman any and all unusual performance of the equipment he is monitoring. The control room operator has the authority to shut and cool down the reactor whenever, in his judgment, it is necessary to do so.

In order to fully qualify as a control room operator, an individual must have received a reactor operator license from the NRC. He must also have had two years of experience in

a power plant, at least one year of which must have been in a nuclear power plant. Licensee also evaluates the character and maturity of applicants for the position of control room operator in light of the significant responsibility imposed upon these individuals on a daily basis. A control room operator must have received a high school degree or its equivalent.

The 42 auxiliary operators, 6 per shift, operate and inspect equipment located throughout the nuclear power plant station as required to support day-to-day reactor operations. From his position outside of the control room, the auxiliary operator has a very close-up view of the plant's equipment, in contrast to the centralized perspective of the control room operating staff. The activities of the roving auxiliary operators are directed by the shift foreman or by a designated control room operator. This coordination enables the control room to maintain a "hands-on" view of the facility at the same time as information is available to them from the instrumentation located in the control room. The auxiliary operator's duties include notification of appropriate personnel if established radiological control limits are exceeded; assisting in the receipt, storage, loading, and unloading of fuel; and assisting Radwaste Operation's personnel in the shipment and disposal of irradiated materials and waste, as directed.

Licensee seeks to obtain auxiliary operators who exhibit mature judgment. Applicants are evaluated for this

capability when they interview for the position of auxiliary operator. In addition, prospective auxiliary operators are evaluated to determine whether they have the ability to progress to higher levels of responsibility and to train for and obtain an NRC reactor operator license.

In addition to managing the shift operating staff, the Supervisor of Operations is in charge of the TMI-1 Radwaste group.

The TMI-1 Radwaste organization, directed by the Supervisor of Radwaste, carries out the daily radioactive waste activities at the facility. It is the job of this group of individuals to collect, decontaminate, package, prepare to ship or otherwise properly dispose of materials, liquid and solid, which exceed a specified level of radioactive material. Pursuant to Company policy, NRC's regulations, applicable NRC Regulatory Guides, and other industry criteria, the Radwaste organization keeps the facility as clean as possible, with the goal of minimizing the radioactive exposure of on-site personnel.

The Radwaste organization has changed significantly since March of 1979. Prior to the TMI-2 accident, radwaste activities were a part of the Three Mile Island health physics program; consequently, there was no staff specifically allocated with the responsibility of decontamination, packaging, preparation for shipping and minimizing the quantity of radwaste at Unit 1. This is no longer the case. Not only are

the individuals who work for the Supervisor of Radwaste dedicated solely and on a full-time basis to Unit 1 activities, but they are also designated TMI-1 Radwaste staff.

The Supervisor of Radwaste directs the activities of the 24 individuals reporting to him. One of the goals of the Supervisor of Radwaste is to develop, through experience, a rotating decontamination system which will ensure that the protected and vital areas at TMI-1 are maintained in as clean and radioactively-free an environment as possible. The Supervisor of Radwaste meets several times a week with the Manager of Operations, coordinating the activities of radwaste personnel with the needs of the operating and maintenance staff. Much of the time of the Supervisor of Radwaste is spent doing radwaste engineering support work such as drafting procedures and working on plant modifications related to his area of responsibility, e.g., evaluating the need for new valves and additional piping to improve the efficiency of the Unit's radwaste evaporators.

It is the job of the Supervisor of Radwaste to coordinate his work and the work of his staff with the activities and responsibilities of the Radiological and Environmental Controls Division (R&EC) of GPU Nuclear Corporation. Given the nature of radwaste activities, in most instances it is necessary for Radwaste personnel to obtain Radiation Work Permits (RWPs) for work performed. These permits must be obtained from R&EC. In addition, radwaste work

must be closely monitored by R&EC in order to ensure that required radiation limits on personnel exposure, and limits on shipments, packaging, disposal and other radwaste activities, are not exceeded.

The present Supervisor of Radwaste, Mr. Edward Fuhrer, took over his current responsibilities in November of 1979. For three and a half years prior to assuming the position of Supervisor of Radwaste, Mr. Fuhrer worked at TMI as a radwaste engineer. In that capacity, he provided technical support, such as "trouble-shooting" malfunctioning radwaste systems and drafting radwaste procedures, for both TMI-1 and TMI-2. Prior to working at Three Mile Island, Mr. Fuhrer was employed by Metropolitan Edison Company for over two and a half years as an environmental engineer. Mr. Fuhrer graduated from Drexel University in 1973 with a Bachelor of Science degree in chemical engineering.

Working for the Supervisor of Radwaste is a radwaste engineer, who assists the Supervisor by writing procedures and by trouble-shooting the system when problems arise which need immediate evaluation. (This position has just recently been vacated and strenuous efforts are underway to obtain a qualified replacement.) Decontamination, storage, and preparation for shipping activities at TMI-1 are directed by the Supervisor through three radwaste foremen and twenty radwaste workers.

The Unit 1 Supervisor of Operations is also in charge of the activities of several operating engineers from whom he

can obtain immediate and short-term engineering work. These personnel assist the Supervisor of Operations in writing operating procedures, reviewing these procedures for their effectiveness, and otherwise providing additional support for operations-related engineering problems. For example, one of the jobs delegated to the senior operating engineer is the review of operators' log sheets to discern and evaluate operating trends. The availability of operating engineers within the Operations staff provides added depth to the station organization in that three levels of technical support are now available to plant operations: first, from within the Operations department; next, from TMI-1 Plant Engineering on site; and additionally, from the Technical Functions staff of the GPU Nuclear Corporation.

A major addition to the shift staff responsible for the safe operation of TMI-1 is the presence of a Shift Technical Advisor on a twenty-four hour basis immediately available on site when the plant is in operation. The role of the Shift Technical Advisor (STA) is a new one within the commercial nuclear industry in the aftermath of the TMI-2 accident. It is also a unique role, in that the STA works directly and intimately with the shift operating staff, yet reports to the Technical Functions Division of the GPU Nuclear Corporation, and thus provides technical support independent of the shift operating personnel.

The position of STA was instituted at TMI-1 in response to the accident at TMI-2, and was subsequently adopted as one of the recommendations of the NRC Lessons Learned Task Force, NUREG-0578 (1979). One degreed engineer is assigned to each of the six unit operations' shifts. In addition, two individuals are assigned as "STA Trainees," thereby bringing the total number of individuals currently participating in the STA program to eight.

It is the STA's primary duty to assess the impact which various plant operations may have on nuclear and environmental safety. During accident or off-normal conditions, the STA's specific duties include recognizing and diagnosing unusual reactor and instrument responses. During normal operating conditions, the STA's duties include the review and evaluation of plant performance, and of the adequacy of procedures used to assess that performance.

Thus, the STA monitors and provides direct technical input to the on-going activities in the TMI-1 plant. Because an STA must have a Bachelor of Science or Engineering degree, he provides additional analytical and technical capability to support the operator on an around-the-clock basis. The STA can, for example, analyze conditions in the core in the event of a transient. This analytical capability heretofore has not necessarily been present. On an ongoing basis, the STA evaluates the need for and recommends corrective action on safety components and systems; advises the shift foreman or

shift supervisor, as needed; and provides a technical liason with the Corporation's engineering staff in Technical Functions.

In order to qualify for the position of Shift Technical Advisor, an individual must have a Bachelor of Science or a Bachelor of Engineering degree; a minimum of two years of related experience in power generation; a thorough knowledge of nuclear plant systems and components; and the training necessary to be licensed as a senior reactor operator.

The credentials of each of the six individuals serving as TMI Unit 1 STAs meet or exceed the qualifications which are prerequisite to assuming an STA's responsibilities. For example, several of the incumbent STAs have Masters degrees, as well as Bachelor of Science or Engineering degrees. In addition, Licensee is requiring its STAs to undergo a rigorous training program in which they receive college-level training in particular areas, such as nuclear theory and transient analysis; gain simulator experience; become intimately familiar with the function, physical layout and operation of the various TMI-1 systems; are briefed extensively on emergency procedures; and individually receive additional education in specific areas, e.g., a nuclear engineer may need additional work in the field of electrical engineering. This training is currently scheduled to be completed prior to restart of Unit 1.

BY WITNESSES HUKILL AND TOOLE

The Maintenance Department is the other major station organization which reports directly to the Unit 1 Manager. At the top of the Maintenance organization is the Superintendent of Maintenance. In contrast to the organization utilized by Licensee prior to the accident at TMI-2, the maintenance activities for Unit 1 are conducted entirely separately from any such activities which may be on-going at Unit 2. The responsibilities of the Superintendent of Maintenance at Unit 1 are limited to the maintenance activities at that unit; he is no longer responsible for any Unit 2 activities. The activities of the TMI-1 Maintenance Department are monitored by the Maintenance and Construction Division of GPU Nuclear Corporation. The Maintenance and Construction Division establishes uniform policies, practices and procedures for all GPU nuclear maintenance, repair and construction activities. Using these corporate policies and procedures, the TMI-1 Superintendent of Maintenance then establishes plant level procedures specifically designed for the control and coordination of maintenance at Unit 1.

The Superintendent of Maintenance, in coordination with the Supervisor of Operations, is in charge of planning, organizing, integrating and directing the daily maintenance effort that takes place at Unit 1. It is the responsibility of the Superintendent of Maintenance not only to coordinate

preventive maintenance, but also to direct the diagnosis and repair of all equipment that Operations has identified as in disrepair, requiring component replacement or in need of other corrective maintenance work. The Superintendent of Maintenance obtains technical support from the plant engineering staff in carrying out his responsibility for preventive and corrective maintenance. In the event that the necessary work appears to require a great deal of manhours or technical analysis, the Superintendent of Maintenance through plant engineering calls upon the technical resources available from the Technical Functions Division of the GPU Nuclear Corporation. Major plant maintenance and construction activities are assigned to the Maintenance and Construction Division of GPU Nuclear Corporation.

It is the responsibility of the Superintendent of Maintenance to oversee all maintenance activity at TMI-1. He directs outside contractors to support the department's workload and schedule requirements. For example, if contractor maintenance personnel are present at the facility, their activities are reviewed and coordinated with the Operations Department by the Superintendent of Maintenance. Similarly, if engineers employed within the Technical Functions group of GPU Nuclear Corporation have been brought to the site by Plant Engineering for the purpose of engaging in maintenance work, their activities will be in support of work scheduled by the Superintendent of Maintenance. It is through this centralized

organization that TMI-1 management effectively coordinates and scrutinizes all on-site maintenance activities. In carrying out his responsibilities, the Superintendent of Maintenance frequently meets with the Supervisor of Quality Control in order to ensure that maintenance work is performed in accordance with the Operational Quality Assurance Plan. There are currently about 150 full-time employees assigned to the Superintendent of Maintenance to plan, direct, supervise and execute the corrective and preventive maintenance programs at TMI-1.

The current Superintendent of Maintenance, Mr. Daniel M. Shovlin, is a Navy veteran of twenty-seven years. During his Navy career, Mr. Shovlin spent six years as Chief Engineer and Repair Officer on several large combatant surface ships. In this capacity, he was responsible for the operation and maintenance of the ship's main propulsion plant, auxiliary machinery, and piping systems, and for the operation and maintenance of electric power generation and distribution systems. From 1972 to 1973, Mr. Shovlin served as a member of the Naval Board of Inspection and Survey as an Engineering Inspector. Mr. Shovlin began working at TMI in 1973 as the Unit 1 Supervisor of Maintenance in charge of instrumentation and control, mechanical, electrical, and utility maintenance functions. He remained in this position until January, 1977, at which time he assumed the responsibilities of Supervisor of Maintenance at TMI Unit 2. In December of 1977, Mr. Shovlin

became the Superintendent of Maintenance responsible for all maintenance activities on Three Mile Island. In November of 1979, when the TMI-1 and 2 organizations and units were formally separated, Mr. Shovlin was designated as the Superintendent of Maintenance at TMI-1.

Maintenance is divided into two, entirely separate organizations: the preventive and the corrective maintenance groups. The preventive maintenance group conducts the Preventive Maintenance Program. This Program is designed to promote safety and optimize equipment availability and reliability. The Supervisor of Preventive Maintenance is in charge of this effort. It is his job to identify resources that are necessary to accomplish particular preventive maintenance work, and to assign workers to the job.

The current Supervisor of Preventive Maintenance, Mr. M. G. Snyder, worked in the United States Navy from 1958 to 1962 as an Electronics Technician. While in the Navy, Mr. Snyder attended Electronics Technician Class A School (1958-1959). During his last year and a half in the Navy, Mr. Snyder was the leading petty officer of the Electronics Division aboard the USS GALVESTON. In 1966, Mr. Snyder joined the Saxton Nuclear Experimental Corporation as an instrument technician. He stayed with Saxton until 1972, at which time he joined Licensee as an instrumentation maintenance foreman. While at TMI, Mr. Snyder became the instrument and control

maintenance department supervisor (December, 1978), and the TMI Unit 1 preventive maintenance supervisor (November, 1979).

Through its preventive maintenance program and staff of 24 employees it is the goal of Licensee to assure reliable performance of equipment and to reduce to an absolute minimum the amount of necessary corrective maintenance work at TMI-1. By regularly inspecting and performing other preventive maintenance work on TMI-1 systems, particularly those related to the facility's safety and reliability, equipment is less likely to fall into disrepair and consequently, the unit is more likely to operate on a full-time basis.

In addition to the maintenance staff working full-time on preventive maintenance activities, Licensee's TMI-1 Maintenance Department has a group of about 94 workers under the direction of the Supervisor of Corrective Maintenance who perform necessary instrument and control (I&C), mechanical, electrical and utility maintenance work.

The Supervisor of Corrective Maintenance, in contrast to his Preventive Maintenance counterpart, is in charge of all TMI-1 maintenance work that is corrective, rather than preventive, in nature. It is his responsibility to ensure that necessary corrective maintenance meets the needs of TMI-1 Operations. On a daily basis, the Supervisor of Corrective Maintenance plans, organizes, and directs corrective maintenance work at Unit 1. It is also his job to identify,

request and utilize resources necessary to accomplish particular kinds of maintenance work, including seeking assistance from the Maintenance and Construction Division of the GPU Nuclear Corporation or from outside sources if it becomes necessary or preferable to do so.

Reporting to the Supervisor of Corrective Maintenance are the Lead Foremen in the areas of I&C, mechanical and electrical, and the Supervisor of Shift Maintenance. Each of these Lead Foremen is responsible for the activities of the foremen and the 24-hour shifts of maintenance workers reporting to the foremen. This responsibility encompasses all activities related to the planning, organizing, and directing of day-to-day maintenance in their respective disciplines taking place at TMI-1. All work performed in the unit must be cleared with the Operations staff in order to ensure that it does not interfere with ongoing operational activities.

The current Supervisor of Corrective Maintenance, Mr. R. R. Harper, served in the United States Navy from 1962 to 1968 as an Electronic Technician and Nuclear Reactor Operator. While in the Navy, Mr. Harper attended Electronics Technician Class "A" School (1962-1963), the U.S. Navy Nuclear Power School and U.S. Navy Nuclear Power Prototype Training (1964-1965), and served as a Reactor Operator on the submarine USS ANDREW JACKSON. In 1968, Mr. Harper joined the Saxton Nuclear Experimental Corporation as an Instrument Technician. He stayed at Saxton until 1969, at which time he joined

Licensee at TMI as an Instrument Maintenance Foreman. While at TMI, Mr. Harper became the Instrument and Control Maintenance Department Supervisor (1974). Mr. Harper was transferred to Licensee's Portland Generating Station (Sept. 1978) as the Supervisor of Station Maintenance. In November 1980, Mr. Harper rejoined the Three Mile Island staff as Supervisor of Corrective Maintenance.

It is the responsibility of each Lead Foreman to coordinate his activities with the Operations Shift Supervisor and Shift Foreman, and to interface with Radiological and Environmental Controls, which issues RWPs to maintenance personnel. Finally, of course, all corrective maintenance work must be performed in accordance with the Operational Quality Assurance Plan. It is the responsibility of the Lead Foreman in each of the disciplines contained within the Corrective Maintenance group to see to it that this requirement is met.

The shift maintenance work force is composed of six rotating sections. Each section is normally comprised of a minimum of 2 men from each discipline: Electrical, I&C, Mechanical and Utility (approximately 10 men per section). Shift maintenance normally works on corrective maintenance items that can be completed during an 8-hour shift. Each section is headed by a maintenance foreman. These shift maintenance foremen report to the Supervisor of Shift Maintenance.

It is the responsibility of the Supervisor of Shift Maintenance to organize, coordinate and direct corrective maintenance on shifts.

The current Supervisor of Shift Maintenance, Mr. D. V. Dyckman, received a Bachelor of Science degree in Mechanical Engineering in 1968 from the University of Missouri. He served in the U.S. Navy from 1968 to 1979. During this time he attended the U.S. Navy Nuclear Power School and Prototype Training. Upon receiving this training he was qualified for the Supervision, Operation and Maintenance of a Naval Nuclear propulsion plant. He qualified as a Nuclear Engineer Officer in 1973. He served on two different nuclear submarines as Electrical Officer, Main Propulsion Assistant, Engineer Officer and Executive Officer (2nd in command). He also supervised equipment overhauls, reactor defueling and refueling and reactor startup and testing on two nuclear submarine overhauls in 1972 and 1976 as Senior Supervisory Watch. Upon leaving the Navy in 1979, Mr. Dyckman joined GPUSC, working as a maintenance engineer. His initial assignment was Supervisor of the TMI Unit 2 Auxiliary Building charcoal filter changeout and the design, implementation and maintenance of an emergency air breathing system for Unit 2. Mr. Dyckman was assigned as temporary Supervisor of Corrective Maintenance in October 1979 and served in that capacity until the present assignment in November 1980.

In addition to the two major maintenance staffs, corrective and preventive, reporting to the Superintendent of Maintenance, there are a number of additional maintenance employees whose activities are important in the planning and conducting of maintenance work at TMI-1. A staff of approximately 35 workers, under the direction of the Supervisor of Utility Maintenance, primarily perform housekeeping activities on site. The Welding Foreman assigns and directs the specialized work of crews working on necessary welding activity at TMI-1. He also certifies welders. The Senior Technical Analyst, who also reports to the Superintendent of Maintenance, is primarily responsible for maintenance work associated with the TMI-1 security and communication systems, e.g., metal detectors, key card system, paging system. The Senior and Junior Maintenance Planners at TMI-1 plan, schedule and coordinate normal and outage maintenance work so that this work can be accomplished in the safest, most effective, timely and economical manner.

The Manager of Administration reports to the Vice President of TMI-1. It is the responsibility of the Manager of Administration to see to it that on-going programs at TMI-1 are properly and effectively administered. The Manager of Administration is therefore involved in whatever administrative areas require review, evaluation and implementation (e.g., review of personnel recruiting, personnel retention, employee benefits, and labor relations), as well as assisting the TMI-1

Vice President whenever he needs support on particular projects, e.g., budget/expenditure analyses. The Manager of Administration also functions as a staff assistant to the Vice-President of TMI-1. In this capacity, it is the job of the Manager of Administration to screen incoming mail, prepare outgoing correspondence, assist in the preparation of testimony and other preparatory licensing work, schedule meetings, and assist the Vice-President with audits, staff plans, and any other administrative work delegated to him by the Vice-President of TMI-1. Finally, the Manager of Administration coordinates the administrative work and needs of TMI-1 with the activities of the GPU Nuclear Corporation's Division of Administration to ensure that all necessary administrative work on site is being properly monitored and conducted.

The present Manager of Administration, Mr. Paul Christman, received a Bachelor of Science degree in Civil Engineering in 1957 from the Pennsylvania State University. From 1957 to 1959, he served as a Navy Officer on an amphibious ship. He began working for Licensee in 1959, and held positions in transmission engineering (fourteen years), distribution operations (one year), and operations analysis (four years). Mr. Christman was named to the position of Manager of Generation Administration for the corporate technical support staff on April 1, 1978. He has been serving as the Manager of Administration at TMI-1 since November of 1979. Mr. Christman

has attended the Public Utility Executive Program at the Graduate School of Business Administration, University of Michigan.

BY WITNESSES HUKILL AND COLITZ

Also reporting to the Vice President of TMI-1 is the Manager of Plant Engineering, who is responsible for direct engineering and technical support for operations and maintenance of TMI-1. The TMI-1 Plant Engineering Group provides the on-site technical capability to support the day-to-day safe operation and maintenance of the generating facility. This support covers the electrical, mechanical, nuclear and instrument and control engineering disciplines, plant chemistry and fire protection. The Manager of the Plant Engineering Group oversees these activities. He works closely with the Manager of Unit 1 in order to ensure that appropriate priorities are maintained in those areas where plant Operations or Maintenance require technical support from the Plant Engineering staff. In addition, the Manager of Plant Engineering works with the Unit 1 Manager and his staff in preparing operating and emergency procedures; ensuring that the Technical Specification requirements are met; providing engineering and other technical support to on-going preventive and corrective maintenance work; reviewing and evaluating changes in plant design or procedures; and supporting refueling outage activities.

The Manager of Plant Engineering is the major TMI-1 liason to the Technical Functions division of the GPU Nuclear Corporation. In this capacity, the Manager of Plant Engineering refers to Technical Functions engineering matters for which they are responsible and requests assistance whenever, in his opinion, the nature of the project requires extensive design or other analytical work, or is beyond the level of expertise or the manpower capabilities of his staff. For example, the Manager of Plant Engineering refers to Technical Functions questions requiring plant design changes and requests assistance in nuclear analyses, fuel analyses, or safety analyses.

The Manager of Plant Engineering is also authorized to approve purchase requisitions for material, equipment, supplies and services for engineering and chemistry work performed at TMI-1.

The present Manager of Plant Engineering is Mr. Joseph J. Colitz. Mr. Colitz received a B.S. in mechanical engineering from Villanova University in 1963. He then joined Licensee as a cadet engineer. In that capacity, Mr. Colitz worked on a variety of projects, including technical problems which arose in the generation department with respect to several fossil fuel power plants; plant engineer at a coal-fired power plant; and mechanical maintenance foreman at a coal plant in charge of scheduling all mechanical plant maintenance work and supervising the plant maintenance staff.

In 1967, Mr. Colitz began working at the Saxton Nuclear Station, where he received an NRC operator license and other training in the overall operation and maintenance of a nuclear facility. In 1968, he was assigned to Three Mile Island as the Supervisor of Operations. In that capacity, Mr. Colitz was involved in the initial selection and training of operating personnel at TMI. In 1973, he became the Plant Engineer reponsible for all mechanical, electrical, nuclear and I&C engineering at TMI-1. In August, 1974, Mr. Colitz became the TMI-1 Superintendent responsible for the operation and maintenance of Unit 1. While holding this position, he obtained a senior reactor operator license on TMI-1. In May of 1977, Mr. Colitz was transferred by Licensee to the Reading Generation Department as the Director of Projects. His major assignments while working as Director of Projects were responsibility for industrial waste plants at several fossil units; the back-fitting of a fossil unit with a cooling tower; and the installation of the TMI security system. In April of 1979, Mr. Colitz was sent to TMI to assist in TMI-2 post-accident activities. He was initially involved in acquiring necessary manpower to engage in clean-up and other activities. He also served for approximately five months as the senior on-site representative on the back shift at Unit 2. Mr. Colitz assumed the responsibilities of the Manager of Plant Engineering at Unit 1 in the latter part of 1979.

The Plant Engineering staff is subdivided into the areas of engineering work, fire protection, chemistry, the generation maintenance system, and project engineering. A total of about 45 people are assigned to Plant Engineering.

The Engineering staff is composed of Lead Engineers and supporting engineers in each of the following disciplines: mechanical engineering, nuclear engineering, electrical engineering, and instrument and control engineering.

The Lead Nuclear Engineer, with the assistance of a support engineer, is responsible for nuclear physics testing, evaluation and procedures. The Lead Nuclear Engineer and the engineer reporting to him, in coordination with his counterpart in the Technical Functions organization, directs nuclear physics tests to verify core design parameters; analyze periodic surveillance reports with respect to core parameters; review and comment upon operating, test and maintenance procedures and procedural changes that affect core parameters; evaluate nuclear parameters in order to ensure that they are within the limits prescribed in the TMI-1 Technical Specifications; and assist in areas of plant operations and maintenance which require expertise in the nuclear physics area, such as maintaining special nuclear material inventory records in accordance with the requirements of 10 C.F.R. Part 70, and coordinating nuclear fuel movement during outages.

The current Lead Nuclear Engineer, Mr. W. Scott Wilkerson, received a B.S. degree in nuclear engineering from

Rensselaer Polytechnic Institute in 1976. Upon graduation, Mr. Wilkerson began working for Licensee as a nuclear engineer, developing a program for plant performance testing on TMI Unit 1. In 1977, he transferred to Metropolitan Edison Company's Nuclear Fuel Group and, in that capacity, worked on nuclear physics-related projects, including T[illegible] physics testing, cycle reload evaluations and licensing, reviewing the TMI-1 nuclear steam supply system safety analyses, and completed accident analyses for fuel handling accidents. Since January of 1979, Mr. Wilkerson has worked as the TMI-1 Lead Nuclear Engineer.

The Lead Electrical Engineer, along with several electrical engineers assigned to TMI-1, provides technical assistance to plant operations and maintenance when the needed work relates to electrical systems and components. For example, the Lead Electrical Engineer will provide technical assistance when Operations or Maintenance is concerned with the operation of the control rod drive system, the pressurizer heater control, the engineering safeguards actuation system, the diesel generators, the main and auxiliary transformers, the inverters and vital busses and any other electrically-related equipment or equipment problem. Like his counterpart in the field of nuclear engineering, the Lead Electrical Engineer performs initial nuclear safety evaluations on design and procedural changes involving electrical equipment or electrically-related problems.

The present Lead Electrical Engineer is Mr. C. E. Hartman. Mr. Hartman received an Associate Degree in electrical engineering in 1965, and a Bachelor of Engineering Technology in electrical engineering in 1970. In 1970, he began working for Licensee at TMI as a Unit 1 project engineer. In this capacity, Mr. Hartman reviewed procurement specifications and vendor proposals on electrical equipment, and reviewed vendor proposals and witnessed factory tests for the various systems, including the control rod drive system, the underwater television system for in-service inspection, the solid radioactive waste packaging system and the boroscope. He also prepared and reviewed operating, maintenance and start-up test procedures for TMI-1. In 1973, Mr. Hartman was designated as the Lead Electrical Engineer at Unit 1. In addition to his daily responsibilities in this position, Mr. Hartman has served for approximately six years as a member of the Plant Operations Review Committee (PORC), and while on PORC, has served as Vice-Chairman for approximately two years and as the Chairman for approximately six months. Mr. Hartman was previously licensed as an SRO on Unit 1.

The Lead Instrument and Control Engineer provides technical support to plant operational and maintenance activities related to I&C components and systems, such as the reactor protection system, the integrated control system, non-nuclear instrumentation, the incore monitoring system, the loose parts monitoring system, the pneumatic control valves and

components, and the turbine electro-hydraulic control system. He also performs necessary nuclear safety evaluations on design or procedural changes involving I&C equipment. The Lead I&C Engineer is assisted by several full-time engineers.

The current I&C Lead Engineer, Mr. Victor P. Orlandi, has received both a Bachelor and a Master of Electrical Engineering degree. After receiving this education, Mr. Orlandi served in the United States Navy. He attended the Bettis Reactor Engineering School in 1969, receiving 586 classroom hours of graduate level courses in pressurized water reactor theory and design. He worked on the staff of Vice Admiral H. G. Rickover until 1973, serving as a nuclear propulsion engineer. In this capacity, Mr. Orlandi was responsible for reactor instrumentation and control systems for five classes of nuclear powered submarines, a total of eight ships. Upon leaving the Navy, Mr. Orlandi worked for Virginia Research, Inc., a consulting firm doing contract work for the U.S. Navy. He began working for Licensee in June of 1974 as the Lead I&C Engineer for TMI Unit 1.

The fourth lead engineer reporting to the Manager of Planting Engineering is the Lead Mechanical Engineer. His technical assistance is available to plant Operations and Maintenance for problems relating to mechanical systems or components. This would include work on steam generators, reactor coolant pumps, pipe hangers, supports and snubbers, heat exchangers and coolers, emergency diesels, the ventilation

system, and piping, pump, valve and filter systems. In supporting TMI-1 operations and maintenance activities, the Lead Mechanical Engineer performs the initial nuclear safety analysis on design and procedural changes involving this equipment.

The current Lead Mechanical Engineer, Mr. R. O. Barley, received a B. S. in Chemistry from Pennsylvania State University in 1969. He served in the Navy for five years, from 1969 to 1974, during which time he attended the U.S. Navy Nuclear Power School and Prototype Training. This training program included a six-month graduate level course of instruction in reactor plant engineering, as well as six months of systems and practical operations training at an operating naval nuclear reactor prototype plant. Upon receiving this training, Mr. Barley was qualified for supervision of operations and maintenance of a Navy nuclear propulsion plant. He was assigned to serve as an officer aboard an operating nuclear fleet ballistic missile submarine for approximately four years, during which time he was the Main Propulsion Assistant (Mechanical Machinery Division Officer); the Damage Control Assistant (Auxiliary Mechanical Division Officer); and the Reactor Controls Division Officer. This duty included service during shipyard overhaul, demonstration and shakedown, and fleet operations. Upon leaving the Navy in 1974, Mr. Barley joined Licensee, working for two years as a TMI Unit 1 Operations engineer during the first years of commercial

operation, and during the first refueling outage. In this capacity, Mr. Barley provided technical support and engineering assistance to the Supervisor of Operations. In 1977, Mr. Barley became the TMI Unit 1 Lead Mechanical Engineer.

In summary, reporting to the Manager of Plant Engineering are eleven engineers, under the direction of four Lead Engineers in the fields of nuclear, electrical, I&C, and mechanical engineering. This group of individuals provides technical assistance on a 24-hour basis to the facility's Operations and Maintenance departments. In the event that a problem requires a significant amount of time, or involves major design or analytical work, the Manager of Plant Engineering will request the assistance of the Technical Functions Division of the GPU Nuclear Corporation. If it becomes necessary to do so, Technical Functions can seek additional assistance from outside consultants. In this manner, Licensee effectively utilizes the layers of resources available to it to ensure the safe, reliable, and efficient operation of TMI-1.

The Manager of Plant Engineering also oversees the activities of the TMI fire protection engineers. The fire protection engineers are responsible for the overall readiness of all fire service and fire protection systems at Three Mile Island. This responsibility includes inspecting the facility on a weekly basis, and notifying the appropriate personnel in the event that any potential fire hazards exist on site;

drafting, revising and reviewing procedures relating to fire protection procedures and equipment; conducting surveillance on fire protection equipment located throughout TMI; and providing technical assistance to the Training Department of the GPU Nuclear Corporation with respect to training programs for the TMI-1 and 2 fire brigades and local fire companies. The fire protection engineers also interface on a regular basis with GPU Nuclear Corporation's Licensing Department with respect to regulatory changes in the area of fire protection in order to ensure that the fire protection system at Three Mile Island complies with current regulatory standards.

The senior TMI fire protection engineer, Mr. T. A. O'Connor, is currently pursuing his Associates degree in fire technology, having completed 47 out of 60 college credits in the fire science program. After graduating from high school in 1966, he served in the nuclear Navy program for nine years. While in the Navy, he attended the Navy Nuclear Power School; qualified as a U.S. Navy S3G prototype mechanical operator and engineering laboratory technician; went to the U.S. Navy Engineering Laboratory Technician School; and became a U.S. Navy S3G Prototype instructor. Upon leaving the Navy, Mr. O'Connor began working for Licensee as a Quality Control assistant. He has worked in the fire protection field for three years, and has held his current position since October 1978.

The Chemistry Department of TMI-1, under the direction of the Supervisor of Chemistry, also reports to the Manager of Plant Engineering. The Chemistry department conducts all TMI-1 water chemistry-related work, including sampling and laboratory analysis on the primary and secondary systems of the TMI-1 reactor, in order to ensure that the water chemistry at TMI meets plant Technical Specifications, manufacturer specifications, and discharge limits. It is also the responsibility of this group to provide technical supervision and assistance in the operation of the water treatment, chemical addition, and waste treatment systems at TMI-1. The Supervisor of Chemistry, with the aid of a Technical Assistant and a Chemical Foreman, directs the activities of the twelve chemistry technicians, who operate on a six shift basis. In addition to managing these personnel, the Supervisor of Chemistry reviews operating plant chemistry procedures and requirements and evaluates the effectiveness of these limits. He is also responsible for the proper operation, calibration, and use of all chemical and radio-chemical analytical and counting instruments, including all laboratory equipment available to plant chemists.

The Chemistry Supervisor recommends water chemistry modifications to the Manager of Plant Engineering, based on analysis and required chemistry parameter limits. He also proposes changes in chemistry-related procedures, as necessary.

The present Supervisor of Chemistry, Mr. J. G. Reed, received a Bachelor of Science degree in 1967 from Pennsylvania

State University. He then worked at the Saxton Nuclear Experimental Corporation for four years (July, 1968 to August, 1972) as a radio-chemist. During his tenure at Saxton, Mr. Reed had full responsibility for plant chemistry and radio-chemistry analyses, including responsibility for complying with the facility's water chemistry Technical Specifications, vendor specifications, and Industrial Waste Permit specifications. He also trained plant operators in chemistry and radio-chemistry. Mr. Reed became a chemist at TMI-1 in August of 1972. In April of 1974, he was promoted to TMI-1 Chemistry Foreman. In January, 1980, Mr. Reed assumed the responsibilities of the TMI-1 Supervisor of Chemistry.

Finally, TMI's Generation Maintenance System (GMS) coordinators report to the Manager of Plant Engineering. The service provided by these individuals augments the capabilities within the Maintenance Department, and provides a useful check on maintenance activities. The GMS analysts coordinate the scheduling of and provide the data to computer operators regarding preventive maintenance work at TMI-1. They also review maintenance work that has been completed in order to verify that necessary jobs are performed on a timely basis. Similarly, the GMS coordinators go through machinery history files in order to discover any previously unidentified generic equipment problems. Such problems might not be evident to plant personnel working on a daily basis with particular pieces of equipment; however, the job of the GMS coordinator is to

look for such trends by examining the system as a whole. The GMS coordinator also schedules and keeps records of all Technical Specification Surveillance Tests performed and assesses the surveillance program to ensure timeliness and accuracy. In general, the GMS department provides the interface between the computer and its on-site users. The department focuses on the integrity and validity of the computer system rather than the accomplishment of specific maintenance items.

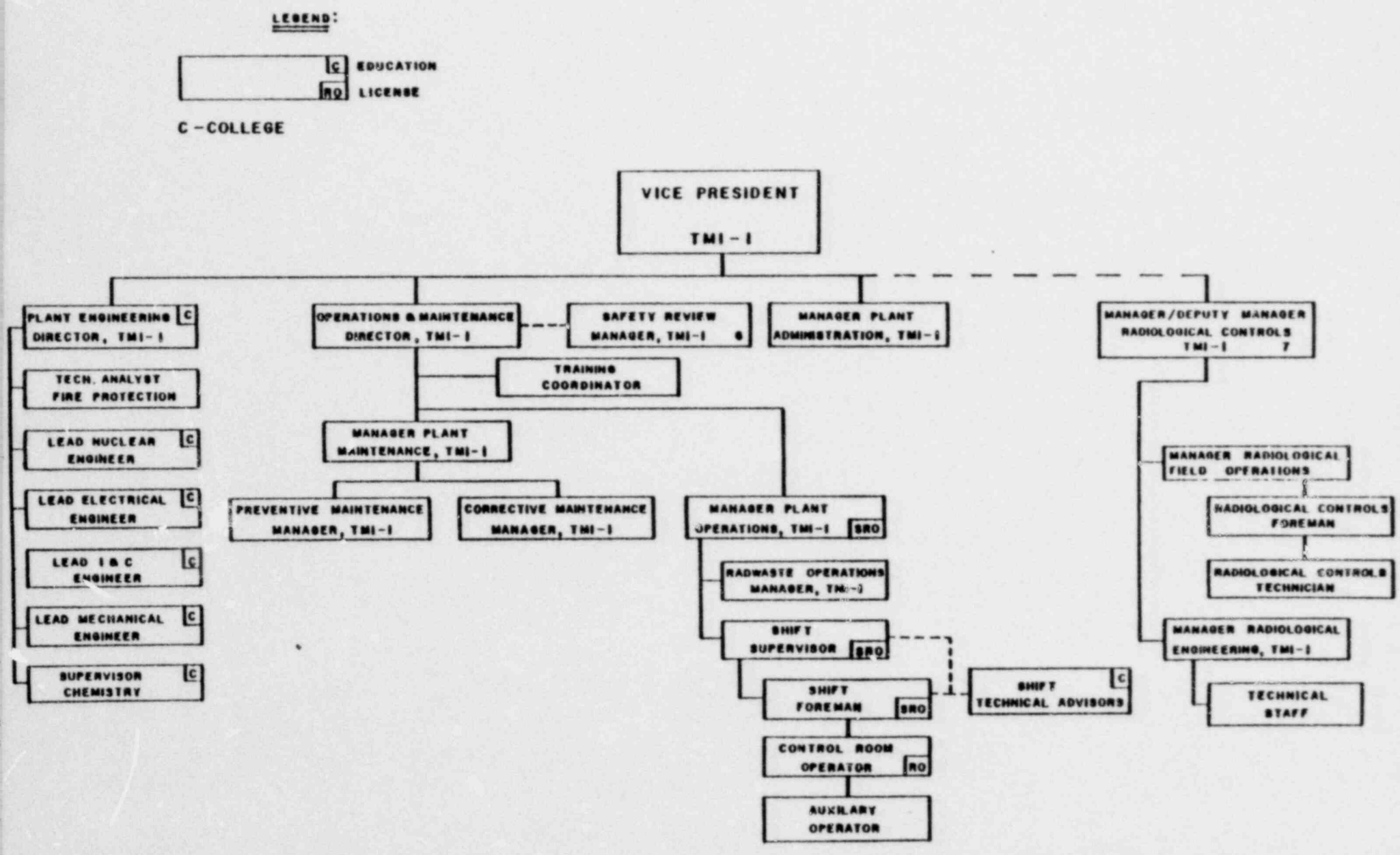
To summarize, it is the function of the Manager of Plant Engineering to provide to Operations and Maintenance necessary on-site technical and engineering services not available within the Operations and Maintenance departments. Through the integration of the capabilities of these separate departments at TMI-1, Plant Engineering can effectively assist Operations and Maintenance in meeting Licensee's goal of operating the facility in a safe, reliable, and efficient manner. On-site engineers in the fields of nuclear, electrical, I&C, and mechanical engineering report to the Manager of Plant Engineering through their respective Lead Engineers. In addition, the Manager of Plant Engineering oversees the work of the fire protection engineers, the chemistry group, and the GMS coordinators.

BY WITNESSES HUKILL, TOOLE, ROSS AND COLITZ

In conclusion, the TMI-1 unit organization has been significantly modified over the past year and a half. The

organizational changes reflect Licensee's commitment to providing to the unit sufficient depth in technical capability, as well as the necessary management oversight to ensure the safe and efficient operation of TMI-1 under both normal and abnormal operating conditions. Highly competent individuals, with extensive nuclear reactor experience, have been incorporated into the unit management organization. In addition, the on-site technical support staff is extensive. Emphasis has been placed on limiting the scope of responsibility vested in high-level personnel so as to free these individuals from non-TMI-1-related duties and purely administrative work. While the facility functions as a separate entity in its daily operation and maintenance, outside assistance is readily available from the other GPU support divisions. This organizational structure enables TMI-1 technical and management staff to effectively utilize the services available from other GPU Nuclear organizations, such as the engineering capability within Technical Functions, as well as from outside consultants, as necessary.

ONSITE ORGANIZATION



CHANGE IN TITLES OF TMI-1 STAFF

Title Shown in Testimony	Proposed New Title (To correct Testimony)
1. Manager of TMI-1	Operations & Maintenance Director, TMI-1
2. Manager of Plant Engineering, TMI-1	Plant Engineering Director, TMI-1
3. Supervisor of Operations, TMI-1	Manager of Plant Operations, TMI-1
4. Superintendent of Maintenance, TMI-1	Manager of Plant Maintenance, TMI-1
5 Supervisor of Preventive Maintenance, TMI-1	Preventive Maintenance Manager, TMI-1
6. Supervisor of Corrective Maintenance, TMI-1	Corrective Maintenance Manager, TMI-1
7. Supervisor of Shift Maintenance, TMI-1	Lead Shift Maintenance Supervisor, TMI-1
8. Manager of Administration, TMI-1	Manager Plant Administration, TMI-1

MR. BLAKE: Mr. Chairman, this panel of witnesses is available for cross examining and questioning by the Board.

DR. LITTLE: Mr. Blake, we were a little bit puzzled by this particular piece of testimony in that it is written in the third person. Is there any particular reason that it was written from the third person?

MR. BLAKE: Nothing in particular, other than with a panel of witnesses it becomes more difficult somehow to say "I"s or "we"s. No particular reason for the style of the third person.

DR. LITTLE: But the panel is responsible for its organization?

MR. BLAKE: Indeed, this panel is responsible and prepared this testimony and will sponsor it and is familiar with it.

DR. LITTLE: All right. Thank you.

CHAIRMAN SMITH: Mr. Adler.

CROSS EXAMINATION

BY MR. ADLER:

Q Mr. Hukill, you were present this morning, I believe, when I was questioning Mr. Arnold concerning your qualifications. I would like to reiterate that I was expressing no reservations about your personal qualifications or abilities. However, we do have some

concerns that I am sure you understand concerning your past experience with commercial pressurized water reactors. And in particular, with your knowledge of the specific design and function of TMI Unit 1.

Now, Mr. Arnold indicated that you have some homework to do before the plant is fired up. And I would like you to explain your process of educating yourself as to the specific design and function of Unit 1.

A (WITNESS HUKILL) If I could, first I would like to say that based on my prior experience, which is basically 17 years in the operation and maintenance of nuclear power plants, I consider the basic theory and the basic components and the basic way it works behind a pressurized water reactor as the same regardless of the size.

When I came here, the size is obviously different, and it is a problem I have got to learn and got to work with. But the basic theory that I have been working with over my 17 years of experience with pressurized water reactors is essentially the same.

The second thing that I look at in my position as a vice president in this organization and what I bring to this organization is that I bring to it a sense of discipline, if you want, and a sense of operating under high standards of safety and of discipline in all aspects of the operation of the nuclear power plant.

I do not look at it as a specific responsibility to be aware of every nut and bolt in the plant, but I do think I bring to the organization the sense of discipline, both from the design standpoint, from the engineering standpoint, especially from the safety standpoint, and discipline in the personnel aspects and in the aspects of complying with procedures, the aspect of plant cleanliness, the aspects of radiologic controls.

Those aspects are the same no matter what type or what size nuclear power plant you are operating with, and I have had extensive experience in that area.

Now, to your specific question on what I feel I have to do. It was obvious to me when I came here that I have to learn a lot more of the details of this plant than I know right now. And I spent approximately one month to two months when I first got here that I did not take over the job. I came in June, and I did not take over the job until September.

During that period of time I had a number of hours -- I did not have my family here -- and I had a number of hours to read a lot of documents, to read the P&W instruction books, to learn the systems, and to get a good feel of the systems.

At the present point, I feel the major thing that I have to still do is to become more aware of the emergency

procedures and what our exact emergency plan calls for and what I would be required to do in an emergency situation. I know that this training is planned, and I fully intend to go through it and fully intend to have it.

The other thing that I think I should mention in this regard is that as the vice president of the unit, I have a thorough knowledge of basic nuclear theory. I understand prints. I understand plans. I understand components in a nuclear power plant. And I have sitting beside me here three of the experts that help me with that. And any problem that we have encountered on the plant thus far I have been able to call on these experts or their assistants to come to my office or I will go over in the plant and I will actually have them lay out before me the print, and I can understand the print and I can follow through the print.

I think it is apparent I will not have the knowledge on this plant that I had on the plant that I operated for 17 years. Again, I feel it is very important that I do learn and become very acquainted with what I would do as an emergency director and what my requirements are as an emergency director.

I do think it should be understood that as the emergency director, that I would not physically be operating the plant; I would have between me at least two sets of

supervisors who have SRO licenses and who would be operating the plant.

Q Mr. Pukill, given the difference in knowledge and experience of, say, Mr. Colitz versus yourself, would you feel comfortable overriding his decision or his recommendation with respect to an aspect of plant engineering during an emergency?

A (WITNESS PUKILL) I think, from an overall viewpoint of the public health and safety, and if, for example, there was a major release that I thought was imminent or there was some danger to the public health and safety from a recommendation that Mr. Colitz made, I feel I am qualified to make that judgment. And I would not hesitate in any way to override Mr. Colitz' decision in that nature.

If it was a specific technical detail of component in the plant, I would have him sit down and explain to me what it was. And if his answer was logical and made sense to me from a technical point of view, I would agree with him.

Q You indicated that in theory there is no difference between the operation of a small reactor that you are familiar with and a large commercial reactor. What is the difference in terms of the consequences of an accident, the consequences of potential releases?

A (WITNESS HUKILL) I really --

CHAIRMAN SMITH: Mr. Adler, it is going to be a long afternoon, I see, if -- proceed.

WITNESS HUKILL: I don't know if I am qualified to say that. I know the consequences of any nuclear incident are accident are severe. And to quantify the difference in an accident with a Navy reactor that I am used to working with or this reactor, I cannot really say. I am not qualified to make that judgment.

MR. ADLER: Mr. Chairman, it is not my intention to go through an exhaustive analysis of the differences.

CHAIRMAN SMITH: I beg your pardon?

MR. ADLER: It was not my intention to go through an exhaustive analysis of the differences. And that, in fact, was my only question along those lines.

CHAIRMAN SMITH: Well, it was obvious that I felt it was not a productive question. However, not all Board members agree with me. So --

BY MR. ADLER: (Resuming)

Q There are two other individuals with whom I would like to cover the same ground. One is Mr. Toole, and I would like Mr. Hukill's comments on this as well as Mr. Toole's. Your qualifications are listed on pages 9 and 10 of the testimony.

Now, my first question for Mr. Toole concerns the

fact that you have spent two years since February of 1980 supervising two coal-fired plants. And I would like to know whether that has affected in any way your ability to keep up with the state of the art in the nuclear field?

A (WITNESS TCOLF) I did not spend two full years at Homer City, although I lived there. I spent more time at TMI than I spent in Homer City in those two years. I spent ten months at Homer City and 14 months of that time frame at TMI.

I think the experience of the coal-fired plant was a tremendous experience as far as an application to a nuclear plant, in that there were many problems, mostly in the area, as Mr. Hukill defined them, disciplined approach to doing business.

And I would feel that my time frame at the coal-fired plant helped develop some patience and insight that I think have improved my position for working in a nuclear plant.

As far as technically, I do not think that I was away that long, is what I am trying to say, in the ten-month time frame.

Q Your responsibilities as manager of TMI-1, I suppose your new title will be Operations and Maintenance Director, will involve the actual operation of the plant, will it not, an operating nuclear plant?

A (WITNESS TOOLE) Yes, it will.

Q I note that in the past you have been a test superintendent, an assistant test superintendent, a refueling supervisor, shift test director, and a shift test engineer. And I would like you to relate the applicability of your experiences in the testing field to the actual operation of the plant when it is up to full steam.

A (WITNESS TOOLE) I think from my experience in the test department, what I bring to the plant is an insight as to the priorities in maintaining equipment and scheduling and maintaining the plant in the proper condition to operate effectively.

That is the end of my answer, unless I missed something.

Q Do you feel there are any significant differences in operation that requires you to do additional research or provide yourself with additional training, as Mr. Hukill is attempting to do?

A (WITNESS TOOLE) During the test program I was exposed to many levels of operation at the plant and many experiences of operating the plant. Certainly, there are areas that I always need to improve in, but I am not sure that there are many areas that I have not been exposed to.

Q The third person is Mr. Dyckman, who, of course, is not present. So perhaps Mr. Hukill can comment on this.

Whose qualifications are outlined on page 37. Mr. Dyckman will be supervisor of shift maintenance, so he does not have the same direct responsibilities with respect to direct operation in emergency actions.

However, I would note that he has been in the Navy until 1979, when he joined GPUSC. And I would like your assessment, Mr. Hukill, whether his lack of experience with commercial pressurized water reactors will in any way impair his ability to function in that position.

CHAIRMAN SMITH: You might recall, Mr. Adler, that Mr. Dyckman appeared as a witness here, and the Board questioned him at great length about his relative inexperience at Met Ed, the identical subject matter, if that helps you any.

MR. ADLER: In fact, I do not remember that.

CHAIRMAN SMITH: Am I correct about that?

MR. BLAKE: Yes, you are.

CHAIRMAN SMITH: He came here to discuss corrective maintenance, but while he was here we decided it was an opportunity to find out something about the people who will be important in the TMI-1 unit.

However, it does suggest a question. At that time, he was manager of corrective maintenance, and now I see that he has another job. It is Supervisor of Shift Maintenance. What is the difference? Is he below -- just

tell me how his job -- what happened.

WITNESS HUKILL: He right now works for the supervisor or the corrective maintenance manager -- excuse me -- and if you do not mind, since Mr. Toole is directly involved in this, I would like Mr. Toole to answer this, if it is all right with the Board and all right with you.

MR. ADLER: That is fine.

WITNESS TOOLE: The Shift Maintenance is a new organization as far as this size level to Met Ed. We always had a Shift Maintenance -- not always, but we have had Shift Maintenance for a considerable time frame, but it was a relatively minor work force. The assignment of Mr. Dyckman in this area was to provide a strength. And we feel the key to successful maintenance on shift is to have a well-disciplined individual who understands how to schedule and maintain the program in a very disciplined approach.

In performing shift maintenance we also have got a considerable amount of procedure development to go through to make this a very effective work force. And we felt that Mr. Dyckman was the best individual we had to do that at this time, and his background should allow him to develop a very good procedural shift maintenance program.

CHAIRMAN SMITH: If you are not satisfied with what I said about our previous inquiry into Mr. Dyckman's background, proceed. Have I helped you at all to recall

that?

MR. ADLER: I would have to go back, of course, and look at the transcript. Obviously, his qualifications are listed here. And as previously said, I was not going to elicit for the record a reiteration of what is on paper.

CHAIRMAN SMITH: We have the same concerns, and we inquired at great length on that point.

MR. ADLER: I have one follow-up question then.

BY MR. ADLER: (Resuming)

Q You indicated, I believe, Mr. Toole, that he was the most appropriate person available to you now. Was that your testimony?

A (WITNESS TOOLE) Those are the words I said, yes.

Q Did you make any efforts to look outside your organization for someone who might be more appropriate and who had more experience with commercial reactors?

A (WITNESS TOOLE) We had Mr. Dyckman at the time, and we felt that this was a job that was very appropriate for him at the time, and we did not look outside.

When I say "now," I think it is because I do not expect Mr. Dyckman to stay in this job for an extended time frame. It is an assignment where he will be involved in the time frame that it takes to develop and make this an efficient operation.

Q For all of my following questions, whichever

witness is most appropriate to answer may answer, unless I state otherwise. My next set of questions concerns the authority to shut down the plant. And throughout your testimony you have indicated quite a number of different levels in personnel who have the authority to shut down the plant. I will list them.

First you have Mr. Hukill, the vice president of TMI-1, on page 5; the TMI-1 Manager, Mr. Toole, on page 8; Supervisor of Operations, Mr. Ross; the Shift Supervisor or Shift Foreman and Control Operators.

And my question is whether all those authorizations to shut down the plant are completely independent. Can each of those personnel shut down the plant with no authorization from any other person?

A (WITNESS HUKILL) I will answer that question: Yes, each one of those personnel listed has the authority on his own initiative, and if in his judgment such action is necessary he has the authority and the responsibility to shut down the plant.

CHAIRMAN SMITH: I have questions along that line I would like to put in here for continuity, if you don't mind.

MR. ADLER: Certainly.

CHAIRMAN SMITH: I assume you are talking about some guideline which would be an emergency compared to other

shutdown decisions. I mean you do not allow each of those persons to decide unilaterally to shut down because he thinks, "Well, it is about time we get down to some maintenance." You are talking about emergency shutdowns, aren't you?

WITNESS HUKILL: No, sir. But he has to have that authority to properly carry out his duties. It is obvious we are going to teach them, you know, in any kind of safety situation or situations they do not understand, they should shut down the plant. They have to understand, and they will understand, that if they have made that decision, they are going to be held accountable for it.

CHAIRMAN SMITH: All right. Do they -- could you describe the guidelines as to where emergency circumstances stop? Do they have such guidelines?

WITNESS ROSS: In the case of the operators, guidelines do exist in our administrative procedures. They exist for the control room operator. Basically, they are to protect life, property, or the public, to shut down immediately. That is considered an emergency.

CHAIRMAN SMITH: That is the operators?

WITNESS ROSS: Yes, sir. If it is not an emergency, he is to refer to his next level of supervision. Let's take me, for instance: When I want to take the plant off, the same guidelines do apply to me. In an emergency, I

cannot contact my next level of supervision, I would not hesitate to take the plant off or order it off. By the same token, if it is something that is planned, of course, we would seek higher approval and bring the plant off in an orderly, controlled fashion, giving sufficient notice to our management so load arrangements can be made.

CHAIRMAN SMITH: So, I think you have answered my question in a way I did not expect. The guideline would be that if you have a reasonable amount of time in a given transient, you each would check up the line to Mr. Hukill, but if you do not have, in your judgment, enough time, then you have the unrestricted authority to shut down?

WITNESS ROSS: That is correct, sir.

WITNESS HUKILL: I might just add, Mr. Chairman, that my background and my training has always been in the operation of nuclear power plants, that in a situation such as this, again, I was brought up on the seagoing ship operating plant, and that is a little bit different, but anytime you are in port, in my education and upbringing, that if there is an unusual situation of any kind that you really cannot explain, you look very closely and hard at it. And if there is any question in your mind, you shut the plant down.

And I would assume in the case you are talking about where we had a time frame to look at it, it would come

up through my chain through Mr. Ross and through Mr. Toole and to me. And my attitude is that that I just explained to you: We would not keep the plant on the line if there was any question in my mind or theirs as to the safe operation of the plant.

BY MR. ADLER: (Resuming)

Q With respect to control room operators, is that only licensed operators?

A (WITNESS ROSS) The answer to that is "Yes." It is only licensed operators.

A (WITNESS HUKILL) I might add to that that only licensed operators are permitted to operate the plant.

CHAIRMAN SMITH: You -- there is testimony in here that you are going to have unlicensed control room operators present in the control room.

WITNESS ROSS: Mr. Chairman, that is correct. In accordance with the Code of Federal Regulations and in accordance with our own procedures, an unlicensed operator cannot take any action that is not supervised by a licensed operator.

CHAIRMAN SMITH: What is the purpose of the designated operator who is not a licensed operator?

WITNESS ROSS: There are a couple of functions for the designated operator. Basically, it is a training function, number one; and number two, he is an assistant on

shift while he is learning in the area of switching and tagging. In the area of emergency communications, he is also a man we would rely on to make notifications to get help to the control room, the emregency call-up system, that type of arrangement.

CHAIRMAN SMITH: Mr. Adler.

BY MR. ADLER: (Resuming)

Q Is there always either a shift foreman or shift supervisor in the control room, or are there times when the control room operators are there alone?

A (WITNESS HUKILL) Our present plans are to always have a shift supervisor or a shift foreman in the control room. That is what we are aiming for, and that is what we intend to implement as we move along.

Q Either or, so one may be just a shift foreman?

A (WITNESS HUKILL) Mr. Ross reminded me that requirement is when the plant is about 200 degrees.

Q So you could have just a shift foreman and not a shift supervisor?

A (WITNESS HUKILL) That is correct.

Q Now, let's see, a control room operator or a shift foreman shut down the plant. Can you explain the procedures for overriding that shutdown? Let's say Mr. Ross decided to override that decision. What steps would you have to take and what information would you go through to decide whether

that decision was incorrect? And how quickly would you make that decision?

A (WITNESS HUKILL) You want me to answer that?

Q It does not matter.

A (WITNESS HUKILL) Once the plant is shut down, there are certain steps the operators have to take to put it in if you want a hot safe shutdown condition. And if the operator had done this and then Mr. Ross came in and said, "No, that was not the right attitude," the procedures will be that it will come to my attention and we will make the decision whether to bring that plant back on line or not. And obviously, I would go to Mr. Arnold and let him know what my recommendation was and what I would think.

The operator, once he has taken the decision to shut down the plant, it is sort of a final thing. That plant is going to shut down, and you have to put it in a certain state, hot shutdown state, and he cannot just restart it by Mr. Ross walking in.

Q Can I infer from your answer that you would necessarily obtain Mr. Arnold's opinion before you fired the plant back up again?

A (WITNESS HUKILL) I would make a decision on what I thought was the right way to do, and I would call Mr. Arnold on the phone and tell him, "This is the way I think we ought to go." And I would not move without him saying,

"Yes, go."

Q With respect to the control room operators, if there is always a shift foreman or a shift supervisor in the control room, why is it necessary to delegate the shutdown authority to a control room operator?

A (WITNESS ROSS) I guess I do not feel it is a matter of delegating. I guess I feel it is a matter of responsibility. All licensed operators have a responsibility to carry out this action. We do not feel it is a delegation of responsibility.

A (WITNESS HUKILL) I would like to reaffirm that. It is a responsibility of any licensed operator in that plant that to shut down plant if in his mind such action is necessary for the safety and health of the public or for the safety and proper operation of equipment.

Q Is there any authority given to the supervisor of maintenance or the supervisor of corrective maintenance to effectuate a plant shutdown or recommend a plant shutdown if they feel that there is key safety-related maintenance that cannot be done unless the plant is shut down?

A (WITNESS HUKILL) They certainly have the authority to recommend such action. But to the best of my knowledge, they do not have the authority to walk into the control room and order anyone to shut down the plant, because they are not licensed operators in most cases, and

it is not their authority.

A (WITNESS ROSS) If I could add a clarification on that. It would be hard for me to visualize a case where the maintenance supervisor would come into the control room and recommmend us to take the unit off that we would not follow his recommendation.

A (WITNESS HUKILL) And I agree with that.

Q So, if necessary, the maintenance personnel can go to the control room; they would not have to go to Mr. Hukill or write a memo or anything like that?

A (WITNESS TOOLE) That is correct. We assume that the maintenance individual would see something in the plant and would be an individual with enough credibility that the operator would recognize what he was defining and would respond to that.

Q Now, with respect to the manager of plant engineering, he is responsible for ensuring that the technical specifications are met. First of all, isn't it true that violation of certain technical specifications requires the shutdown of the plant?

A (WITNESS COLITZ) That is correct.

Q Now, let's say the manager of plant engineering determines that a tech spec has been exceeded in some respect. What procedure would he use to get the plant shut down, and how long would that take?

A (WITNESS COLITZ) If -- it is hard for me to envision that we would determine that a tech spec was being violated that required shutdown of the plant that would not have already been caught by the operations section. But, you know, in the event we did, my recommendation, whether I would first be able to get in touch with Mike or with Ron, and in my absence any of my lead engineers, we would go directly to either Mike or Ron, inform them of the tech spec violation and the requirement to shut down the plant. And, you know, if it was that clean, I do not think there would be any question that the plant would be immediately shut down.

Q Are the control room operators held directly accountable to you? You have answered a number of questions by -- I am sure they would cut it down. Have they been instructed that if they receive an instruction from either yourself, Mr. Colitz, or the maintenance personnel that I referenced earlier, are they required to shut down the plant on your direction?

A (Witness Colitz) I do not think the control room operators were ever instructed that if I personally told them to shut the plant down, that they would.

I would not deal directly with the control room operator. Again, I would deal with Mike or Ron, and in their absence I would deal with the shift supervisor and go through that chain of command.

Q On page five of the testimony, it notes that the Vice-President of TMI-1 is the senior liaison with the various technical support groups of GPU Nuclear Corporation.

Can you explain what process is used to resolve any potential disputes between the onsite TMI-1 staff and the GPU support staff?

Would that go directly to Mr. Arnold or to his staff?

A (Witness Hukill) No. I would have to say that it varies depending on the area. For example, the manager of radiological controls for Unit 1 is onsite and is directly

in the plant. His office is in the plant.

He reports to an offsite organization, but he works directly and closely with me and with Mr. Toole and with Mr. Ross and the plant. He comes to my plant managers meetings. I am immediately notified of any problem in radiological controls.

I work directly with him on implementing new ideas in radiological controls, and I probably talk to him ten times a day. So in the area of radiological controls, it is a direct relationship with me and the manager who is onsite.

If there are any problems, or he and I do not disagree -- which by the way -- we have had some disagreements, but nothing we have had to take up in six months. If there is such a disagreement, I would immediately contact Mr. Heward, who is the Vice President for Radiological and Environmental Controls, and we would work it out at our level.

Obviously, if it cannot be worked out at that level, we would take it to the Executive Office, Mr. Arnold or Mr. Clark.

In the other areas, there is a similar relationship; for example, under Nuclear Assurance. The Manager of Training, Unit 1, who comes under Nuclear Assurance, I also work very closely with him. I talk to him on a frequent basis, probably not as often as the Manager of

Radiological Controls.

Mr. Herbein's trailer is down two from mine. If there are any problems that I cannot resolve -- he is the Manager of Training. I go to Mr. Herbein, which I have not yet had to do.

In the area of technical functions, we have onsite technical functions representatives who are closely and deeply involved in the design of the alterations that are in process.

I and the staff here deal directly with them. We have very close coordination with them and any issues of major importance, I contact Mr. Wilson, who is the Director of Technical Functions, and we resolve it at that area.

In the time I have been here, in the time I have been in the job, which is about five months, I cannot think of an incident that we have -- that the Vice-Presidents, myself and the others have had to go to Mr. Arnold's level. But if we cannot resolve it, that is simply where we go.

What I would like to emphasize is the close relationship onsite with these other organizations and their people who are directly involved. As I mentioned, Radiological Controls is very involved in training, quality assurance, technical functions.

I have a manager of administration who works for me for my area and helps me in administration, and he works

very closely with the corporate division of administration in that area, so we have onsite people from all these organizations and senior managers from all these organizations who work with the people here at this table and with other managers in my department.

Again, I think in answer to your question, if there comes a conflict between any of these that cannot be resolved, it comes to my level first because I am onsite and I can see it. If I cannot resolve it between those managers, I would obviously take it up to their vice-president and discuss it.

Does that answer your question?

Q Yes, it does. And there was a related question which I think you have already answered regarding the supervisor of operations who, on page 11, it is stated that he reviews and writes operating procedures.

I noted in some of the upcoming testimony that the technical support staff also reviews operating procedures, and I take it also emergency procedures.

My question is, who has the final say on the final operating procedure or emergency procedure before it is implemented?

A (Witness Hukill) I would say it is on the same line as what I just told you, that if an operating procedure that we send to technical functions and they disagree with

what is in that procedure, it would come back for resolution, and if it could not be resolved at the appropriate manager level, it would be brought to my level and then go to the vice-president level.

Q I have a --

A (Witness Hukill) If the question is who signs it, right now Mr. Toole as the operations and maintenance director of TMI-1 signs the procedure, but we are not going to sign a procedure, and a procedure would not be signed until the concurrence of the review parties is obtained.

Q I have some questions about the role and authority of the shift technical advisors. They are described on page 12. Are their roles purely advisory, or do they have any concrete authority to dictate actions in the control room?

A (Witness Hukill) The role of the shift technical advisor is to give us the advantage of a degreed engineer on shift at all times who we have trained to know and understand the plant, and can evaluate plant parameters and who can evaluate the operation of the plant, and who from a degreed engineer's standpoint, can see problems arising from an engineering viewpoint.

He does not have the authority to shut down the plant, but he is in an advisory capacity as a technical representative of the technical functions, organization who advises the shift supervisor concerning plant operations,

especially from the technical and the engineering viewpoint. So he is an advisor.

DR. LITTLE: In this case you are speaking about a person with a degree in engineering?

WITNESS HUKILL: I believe our words say, engineering or science, as Mr. Arnold defined it before. I know that gives you a little hangup, Dr. Little.

I understand that. I think the words are "engineering or science."

WITNESS TOOLE: That is true. All six of our technical advisors do have degrees in engineering, and I think half of them have masters degrees, two or three of them.

WITNESS HUKILL: I might just mention along the -- concerning the shift technical advisors, I personally have gotten to know a few of them very well. Since the two months I had to learn the plant, I would go over and get the shift technical advisor on shift to take me through and show me the plant, teach me the plant because he was going through the same program, and I am impressed with these same people.

CHAIRMAN SMITH: Is the advice given by the shift technical advisor -- is it formally made? Is there a formal system of advice that he gives?

WITNESS HUKILL: I do not believe there is a

formal system such as a formal piece of paper where the shift technical advisor would write his recommendation down, but he works right with, right next to the shift supervisor, so his advice to the shift supervisor is direct and on the spot.

And also, I am sure that if the shift technical advisor feels very strongly concerning some operation in the plant and he has any problem with the shift supervisor, which we have not encountered as yet certainly, that he would go up his chain to get that at the appropriate level to be brought back to the appropriate level in the plant, either Mr. Toole, Mr. Ross or myself.

DR. JORDAN: I have kind of forgotten now where the shift supervisor and the shift technical advisor sit. Are they in the control room or next door?

WITNESS ROSS: Presently the shift supervisor has an office directly behind the control room. At this time we are also giving space to the shift technical advisor in that particular room.

WITNESS HUKILL: Excuse me. I might add in the evolutions I have observed in the plant -- and we have gone through a number of evolutions in the past months -- both the shift supervisor and the shift technical advisor have been standing almost right next to each other in the control room observing, and the shift technical advisor in overall

charge of those evolutions.

So in answer to the question, yes, when something is going on in the plant they are right next to each other.

CHAIRMAN SMITH: Do they -- excuse me. We have not had an opportunity yet to observe a shift technical advisor in an operating plant.

DR. JORDAN: I think they have not either.

CHAIRMAN SMITH: Right. That was what I meant, we, all of us here.

(Laughter.)

But to date, have you observed useful advice from the shift technical advisor?

WITNESS ROSS: Mr. Chairman, I think we have observed the shift technical supervisor under simulated conditions. During the last four weeks and continuing this week, the shift technical advisors are presently at the Lynchburg simulator participating in crew training.

During that crude training, we had the chance to look at them do their role, and in the concept of crew training that we are into, we did watch the shift technical advisor practice the concept there. It is ongoing now.

CHAIRMAN SMITH: What are your impressions? Is it too early to tell?

WITNESS ROSS: I do not think it is too early to tell. I was down there the first week personally. I was

very pleased.

CHAIRMAN SMITH: Did you yourself like the idea of the shift technical advisor?

WITNESS ROSS: I do now that I see it in operation, yes, sir.

CHAIRMAN SMITH: Is there a morale problem attendant to having, as Mr. Hukill calls them, the bright young professional engineers suddenly popping up in the control room, telling old-timers how to run their control room? Does that create a problem?

WITNESS ROSS: No, sir, quite the contrary. The shift technical advisor of the power plant has been accepted, and he is part of the crew, if you will, in the concept that he can be -- he is accepted and they look to him for advice right now.

CHAIRMAN SMITH: They do? They actually look to him for advice?

WITNESS ROSS: Yes, sir, particularly in the use of steam tables and those type of things.

WITNESS TOOLE: I would like to add that during the initial startup and operation of the Oyster Creek station, as an engineer I worked on shift in a similar position, although it was not defined that way. And I personally found it was a good match in that both sides have something to offer.

As a young engineer I had a tremendous learning process in learning what the problems were that the shift worker dealt with, and what their day-to-day lifestyle was on shift, and as operators, they also spend considerable amount of time with me as far as how to read electrical drawings and what engineering theory was all about.

So I think that it is an excellent concept.

WITNESS HUKILL: I have also been to the trainer now for a total of three days, and I have seen -- the last time I was there they were doing casualty drills, and I was very impressed with the involvement of a shift technical advisor.

We not only had a shift technical advisor, we are taking a full crew to the trainer to train them in the crew concept of ongoing casualties, which I think is fairly new. And we had a shift technical advisor there who was deeply involved in it.

Not only that, we had a training shift advisor there who was also involved in what was going on and what was happening.

I also hope you credit this in my training. I also in my background am used to a degreed individual in the control room at all times. That is the way I have been brought up, and that is what I am used to, so I very strongly support it.

What I have seen of the concept thus far in our plant it is working pretty well.

DR. JORDAN: Did you say casualty training?

WITNESS HUKILL: At the simulator?

DR. JORDAN: Yes.

WITNESS HUKILL: Yes.

DR. JORDAN: I don't understand.

WITNESS HUKILL: Maybe I will let Mr. Ross go into more detail, but we are actually at the simulator now sending one crew a week. We have a six-section rotation.

DR. JORDAN: It is the casualty that bothers me, the word.

WITNESS HUKILL: We are training in unusual events and transients, and that is what I mean by casualty.

DR. JORDAN: I see. I just did not understand what you meant by casualty.

WITNESS HUKILL: Yes, sir.

DR. JORDAN: I had visions of dead bodies.

(Laughter.)

WITNESS HUKILL: There were not any dead bodies when I was there.

(Laughter.)

BY MR. ADLER: (Resuming)

Q I guess the purpose of the STA is to provide more depth to your technical support. On page 27, you note that

you have three levels of technical support within the Operations Department, TMI plant engineering onsite and the technical functions staff of the GPU Nuclear Corporation.

Let's presume you have some sort of unusual event or accident. Wouldn't you also go to B&W to solicit their advice? Would you add that to the list?

A (Witness Ross) The way our emergency plan is laid out, that is built into the emergency plan in that a communication chain is set up that includes B&W techical functions and numerous other personnel, so yes, it would go there.

Q There are obvious benefits of having diversity in the technical support. However, do you also see some problems there short of a too-many-cooks type of problem, or you are getting input from so many different directions and levels, that it might be difficult to determine who is right and who is wrong? And if so, who would resolve those disputes?

A (Witness Hukill) I look at that as the Emergency Director's function, to take all those inputs that are coming in and determining which are the ones that are proper and appropriate and which are the ones he is going to use.

A (Witness Colitz) I might add on that under emergency conditions, where we now have a technical support center that we man with plant engineering, as well as the

B&W onsite rep, in cases we man the emergency offsite center, which is presently at the observation center where we also have technical support and we have tie-lines back to check functions in parsimony and B&W.

Part of these tie-lines between the various technical disciplines is to do an awful lot of the thinking and conversation and evaluating so that these are not all going under the Emergency Director, who has an awful lot of other things to do.

Rather than him getting advice from four different technical areas, the technical areas are basically talking amongst themselves, and there will be a decision from the technical groups that will go to the Emergency Director.

(Counsel for the Commonwealth conferring.)

CHAIRMAN SMITH: I would note that Ms. Bradford representing ANGRY recently has come into the hearing room.

(Counsel for the Commonwealth conferring.)

MR. ADLER: I apologize for the delay.

BY MR. ADLER: (Resuming)

Q With respect to the operating staff, as you begin to testify to on page 13, you have a six-shift rotation and one of every six weeks will be devoted totally to training.

I would like one of you to explain the shift schedule, how long the operators are on, how many times a week they are on, what the schedule is for night operation

and so forth.

CHAIRMAN SMITH: Would you address in the second full paragraph, the second sentence? Is that intended to read as it does, "The shift will be composed of six shift supervisors." That should be the staff.

WITNESS HUKILL: The shift staff is what that is intended to mean, Mr. Chairman.

CHAIRMAN SMITH: You did not make that correction in the testimony, did you?

WITNESS HUKILL: No, sir.

CHAIRMAN SMITH: All right.

MR. BLAKE: It is a correction that we consider made, Mr. Smith. You are right in terms of that clarification.

WITNESS ROSS: I guess to answer your question, I would respond by saying it is a six-shift rotation, which means we have six separate shifts, A through F.

They work basically starting on a Wednesday, six days of daylight, and ending up on a Monday, seven to three. We then would take a normal rotation, would be Tuesday and Wednesday off, and they come on Thursday, three to eleven shift, working that rotation through until the following Wednesday, and including it.

They would then be off Thursday and Friday, coming out eleven to seven; Friday night or Saturday morning, if

you would, starting Saturday morning, and then they work seven days that particular shift, ending the following Friday morning at 7:00 o'clock in the morning.

After that they then come to daylight as a relief person, and they work five days of daylight, Monday through Friday, seven to three. They then have a weekend off, and then they go to training, five days at seven to three, where they are devoted to training.

Upon completion of that cycle, they have off four days in a row off, coming back and starting into the cycle again on the following Wednesday on daylight.

BY MR. ADLER: (Resuming)_

Q So basically it is six on, two off, and you go through the sequence of the three time shifts; then onto -- I'm not sure I follow.

A (Witness Ross) That is not correct. Any one week you only work five days. The pay period being Sunday through the following Saturday. You may work seven days at a time straight in order to, at the end, you get four days at the end off, and you do end up with three weeks of daylight in this particular rotation. That is the advantage to us.

(Counsel for the Commonwealth conferring.)

Q I believe you already answered my next question, which was the limits and authority of both non-licensed

operators and auxiliary operators. Your testimony was that they cannot perform any functio unless they are supervised by a licensed operator.

Now on page 23, you refer to the functions of auxiliary operators who is dispatched to, if changes are required outside of the control room. Are auxiliary operators ever dispatched to those tasks, and are they supervised?

A (Witness Ross) I would like to answer that in a couple of ways. The auxiliary operator is our operator outside the control room. He is under the direct control of the control room operator, and he is the person that does the valve lineups normally outside of the control room.

Q So their supervision is by some means of communication and not by direct supervision?

A Depending on the evolution, it could be by means of communication.

I might add that we have indicators in the control room that do tell us if they have carried out their function properly in most cases.

A (Witness Hukill) I might add they are our eyes and ears out on the plant.

Q Are those engineers directly responsible for supervising the auxiliary operators? Are you saying that they are available if a question is -- arises?

A (Witness Ross) Mr. Adler, we got disconnected there somewhere. The auxiliary operator is a union person, and when Mr. Hukill said he is our eyes and ears, he means he is the guy roving through the plant, checking operating equipment. At some point there we got disconnected there.

Q I am not sure I heard all of Mr. Hukill's remark then. I think I misunderstood it.

A (Witness Hukill) My only comment was that the auxiliary operators are our people in the plant who are the eyes and ears, watching and looking at operating and rotating equipment, and who can carry out evolutions, as Mr. Ross has indicated, and also can report conditions to the operators in the control room as they sit in the plant.

Q I think I translated eyes and ears into engineers.

(Laughter.)

A (Witness Hukill) I understand.

Q Can you be more specific about your answer, Mr. Ross, with respect to the comment that the auxiliary operators' duties include notification of appropriate personnel? If established radiological control limits are exceeded, is that information also given to the control room operators within the control room?

A (Witness Ross) That information, what that really means is if a guy on his routine tours sees an area that is not posted properly, does not have the proper controls, he

would report it to his supervisor in the control room and to the radiological controls department.

(Counsel for the Commonwealth conferring.)

DR. LITTLE: Let me ask a quick question while they are consulting. How did you arrive at the shift schedule? You have people acting as diurnal animals for a week, and then it is nocturnal, and then I think the term for the ones who are active at dusk is crepuscular.

At any rate, you have people continually making a transition from one cycle to another. Did this schedule arrive at some -- after some study about an experience, or how did you come to an experience to have that type of cycling?

WITNESS TOOLE: We looked at a number of cycles. On looking at the number of different shifts, there is only timeframe in the six-week period in which a person is in more or less an abnormal situation, and that on seven straight days you work from 11:00 o'clock at night to 7:00 o'clock in the morning.

But on any other shift he is existing in hours that most normal people exist in, and the three -- the second shift is 3:00 o'clock in the afternoon until 11:00 o'clock at night, which is not that far out of a normal life cycle, more or less.

And within six weeks, we only have one shift, and

as far as looking at many different options, this is as good as we have been able to find.

DR. LITTLE: Have you had some experience with it now? Have people been able to function well with this type of cycling? Have you had any complaints?

WITNESS TOOLE: The number of complaints have gone down significantly from the days we used to work four shifts, four rotating groups, to where we are now working six. And a majority of people consider it bearable, although we still have astigmatism as far as shiftwork is still shiftwork, but there is very limited complaints as far as six-shift rotation.

WITNESS ROSS: I might just add the operators did have some input into our rotation, and they too have agreed it is probably the best rotation we could come up with.

CHAIRMAN SMITH: What are these operators doing now with the plant closed down? I know they are training, but what else do they do?

WITNESS ROSS: Mr. Chairman, many of the functions required in a shut down plant are very similar to an operating plant. There are readings that must be taken. There is equipment that must be rotated, and many systems are in fact functional today.

We are removing the decay heat from the reactor itself. In addition to the training, they are carrying out

their normal functions, which are very similar to being on the line.

In addition, we are upgrading our procedures which they are involved in, and we are also upgrading our training.

WITNESS TOOLE: In support of the maintenance we are doing the operators do place the equipment in a position where the maintenance people can work on it. And they do the switching and flagging.

DR. JORDAN: Who writes the procedures, Mr. Ross? Some of these -- we have seen some of the procedures here, emergency procedures, things like that. Do they originate in your office?

WITNESS ROSS: For the most part procedures do originate in my department. In some cases during specialized emergency procedures, they do come out of engineering.

My department is charged with the responsibility of writing procedures that we use.

DR. JORDAN: So a procedure like -- what was it? 1206-6-b, for example, did you write that one?

WITNESS ROSS: Twelve-oh-two-six-bee has a history that goes back a ways. It is written based on B&W guidelines and a combination of writing went into that, the combination being engineering, personnel and my own staff wrote that particular procedure.

BY MR. ADLER: (Resuming)

Q My next set of questions may relate to TMI-A-5, and if either you gentlemen or Mr. Blake feels this is better addressed, then fine. I am interested in the relationship of the shift supervisor to the supervisor of maintenance.

On page 15, it is stated that the shift supervisor is vested with the authority to change operations and maintenance work priorities as needed.

On page 30, the functions of the maintenance department, the supervisor of maintenance are described.

Who has the override in that situation? Who is the final determinant of maintenance priorities, and which maintenance tasks are most important to safety?

A (Witness Toole) We are working on a repeat basis for the maintenance schedule, and the priorities as identified are identified by operations. Our scheduling is on a weekly basis in which we try and pre-arrange our maintenance for an entire week.

During the day shift, at the beginning of each day we do meet, myself, Mike and the maintenance superintendent, and discuss any priority changes that we would make.

On the back shift, we have a schedule in which maintenance is supposed to follow, and in scheduling on a weekly basis we are trying to bring together all the forces

that are involved with performing a specific job; being the maintenance individual, the operations individual, the QC support, and the radiological control support.

The only one who can change a priority on the back shift is the shift supervisor. He is tasked with the responsibility for operating the unit. If a priority does come up, he would be the individual who would change the maintenance group from working on one item to another item.

He also has the authority to bring in extra support if he does need that. He is tasked with the responsibility of identifying through Mike Ross to myself why he did change the priorities.

Q I have a question that relates somewhat to the Board's question of Mr. Arnold concerning firing or other disciplining procedures, except this question is prospective.

I am concerned with the performance of shift supervisors, shift foremen and control room operators, and I would like to know what procedures you have for reviewing their performance, determining if their performance has been adequate, and what disciplinary measures are available to you and what criteria you would use in order to make those judgments.

A (Witness Toole) When you talk about disciplinary action, what we try to do is understand the reason why an incident occurred. The shift supervisor is tasked with a

tremendous responsibility on the back shift. It is the responsibility of Mike Ross and myself to come in and understand why something did or did not go correctly.

The educational process for an individual as a shift supervisor and the support crew that he is working with is a tremendous complex affair. What we have to ascertain is whether an individual consistently does not perform well or what is the root cause for the problem that has occurred.

And is it a problem of equipment malfunction? Is it insufficient training? Have we misapplied the methods we tried to use to accomplish the job?

As far as discipline, we would be judging is it being improved and is his crew improving and performing as well as we think they should?

The number of repeat performance of problems would then put us into a position of disciplining an individual.

Q All right. You are referring to a continued pattern of performance of a particular operator. Let's say we change that to one instance of, say, gross negligence or gross neglect of duty. What actions would you take and what barriers are there to, say, firing that person?

Are there any labor difficulties, union difficulties?

A (Witness Toole) It all depends. I think that as

an instance for instance, as far as what we consider the level of negligence, I believe as far as level of negligence, if we could determine that, we felt the man needed to be terminated, that it is within our realm to do that.

A (Witness Hukill) Let me just add to what Mr. Toole said. I agree with his quantitative analysis of this situation. However, if there is gross negligence there is nothing that prevents us from removing this person from duty, and as you call it, fire him.

Shift supervisors are not union people. They are management people, and we have appropriate steps to take in management to discharge someone who is not doing his duty properly.

I would hope that that is never necessary, and my many, many, many years of supervising the operation of nuclear power plants, I have had that necessary on about one occasion.

The people you are dealing with and the people I have seen here since I have been here at the Island are dedicated, hard-working individuals, and it is hard for me to see a case of gross negligence on their parts, but if I did see it -- and it would certainly be brought to my attention -- that individual would be removed from his duties immediately.

Q The shift supervisors are management personnel, are the shift foremen?

A (Witness Hukill) That is affirmative.

Q What about the control room operators?

A (Witness Hukill) They are union personnel.

Q Are there any labor-related barriers to firing union personnel that you know of?

CHAIRMAN SMITH: Well, maybe you can refine the question. Is it necessary that your question go to firing them or can it not be limited to removing them from their duties by asking?

BY MR. ADLER: (Resuming)

Q I would like first discussed removing them from their duties.

A (Witness Ross) It is clear within our organization if we are not satisfied with the licensed operator's performance, we are invested authority to remove him from his duties. That is quite clear to us.

As far as your second question on labor-related problems, yes, we do have a union. It is also quite clear that there are guidelines within the contracts that allow disciplinary action to be taken.

Disciplinary action is based on the authority of the occasion. Disciplinary action has in the past been taken in various instances.

(Counsel for the Commonwealth conferring.)

CHAIRMAN SMITH: Mr. Levin?

MR. LEVIN: Mr. Chairman, I think the witness recognized what the question was asking for, that the union have contract provisions and that outline the quantum of proof, the type of acts and so forth, and the procedure for removing a union individual because of "negligence."

I think that is the answer he was looking for.

CHAIRMAN SMITH: That is a digression I hope that we did not go into because if it is essential to your case, then we will, but it seems to me you can come to the point where they are out of the control room, and that satisfies the purpose of the inquiry.

MR. LEVIN: I don't have such a complete knowledge of the record that I know that material to be in the record.

CHAIRMAN SMITH: I doubt if there is any such thing in the record.

MR. ADLER: Mr. Chairman, your distinction was correct. Removing from duties versus firing, and our concern is getting them out of the control room.

WITNESS ROSS: Clarification -- if we could have a clarification now on which question was asked, we could answer it. I guess we do not understand the question clearly.

CHAIRMAN SMITH: You can ask the question. I

don't believe there is anything on the record along the lines you are talking about, if you feel such a question is necessary. Mr. Levin?

MR. LEVIN: Perhaps the witness could simply summarize what the union contracts for control room personnel say with respect to discipline and removal.

WITNESS BOSS: I thought that I had stated that it is quite clear in the contract we in management have the right to take disciplinary action for offenses. That disciplinary action is based on the level and severity of the offense. They can include up to removing the guy on the spot from duty.

BY MR. ADLER: (Resuming)

Q When you stated earlier that either a shift foreman or a shift supervisor are required to be present in the control room at all times, do you believe that a person with a senior reactor operator license should be in the control room at all times?

A (WITNESS HUKILL) Yes, I will take that one and answer it. I do believe that we should have -- you said two licensed senior operators; is that correct?

Q At least one senior reactor operator licensed personnel in the control room at all times.

A (WITNESS HUKILL) Yes, I think we should have one senior reactor licensed operator in the control room at all times, and it is our goal and that is where we are heading. And that is our intent and we intend to meet the regulations -- reactor operator licensees to meet that.

A (WITNESS TOOLE) The shift foreman and the shift supervisor will be senior reactor operator qualified.

Q On pages 19 --

CHAIRMAN SMITH: Just a moment on that.

MR. ADLER: I have not finished, Mr. Chairman, with that line.

CHAIRMAN SMITH: You are going to pursue that?

MR. ADLER: Yes, sir.

CHAIRMAN SMITH: The shift foreman?

MR. ADLER: Yes, sir.

BY MR. ADLER: (Resuming)

Q You list the qualifications of your shift foremen on pages 19 through 21. And I noted that D on page 20 and G beginning on page 21, but continuing to page 22, are not, according to this testimony, senior reactor operator licensees.

A (WITNESS TOOLE) I think I can answer that one. We presently have on the operating staff -- and that is people on shift -- ten personnel who are qualified for senior reactor operator licenses. We additionally have five people on the staff at the Island who also have senior reactor operator licenses.

It is our goal to send three more people up for license exams in May or whenever they occur. That is our present plan, to give us 13 senior reactor operator licensed

personnel that are on a shift rotation. So that would give us an extra shift supervisor or an extra foreman as needed and as appropriate.

So our intent is to go to the point where we have enough people with senior reactor operator's licenses so that both the shift foreman and the shift supervisor do in fact have senior reactor operator licenses. The deadline date for us internally to achieve that is, as for other operating licenses, on 1 July 1982. I have every intent of meeting it before that. And if we get these people up and through, we will be at that point.

As I reiterate, we already have ten SRO-qualified personnel. All six of our shift superintendents are now SRO-licensed.

Q Do you know that Incumbent D and Incumbent G are going to take this exam and become qualified? I don't know if you stated that directly.

A (WITNESS HUKILL) Please state that again.

Q Do you know whether Incumbent D and Incumbent G listed here are going to be SRO's? I do not believe you stated that directly.

A (WITNESS HUKILL) Yes, they are two of the ones we intend to send up.

CHAIRMAN SMITH: By when?

WITNESS HUKILL: Well, our license examinations

are now scheduled for late -- I believe it is late April, early May. And again, this is going to be dependent on what the NRC says and whether they are ready to examine them. They will go up at the same time all the other license people go up for their exam.

CHAIRMAN SMITH: All right. So for these Incumbent D and Incumbent G to maintain their position as shift foremen, they must pass the test, the senior operating test?

WITNESS HUKILL: No, sir. Our goal is to have them pass the test. And our goal and our intent and my internal instructions are going to say that we will have two SRO's on shift. Our obligation and the requirement that we feel we are obligated to meet is that of other operating reactors. It is 1 July 1982.

So if I sent these people up and they did not pass the exam at this time, I am not obligated to have two SRO's on shift until 1 July '82.

CHAIRMAN SMITH: All right. But the question was directed toward the foremen.

WITNESS HUKILL: The foremen are the people we are talking about. I have the shift superintendents right now. All are qualified. So with the three additional foremen that I am sending up, I will then have enough people, provided they qualify, to man every shift with two SRO's

plus a foreman, and the shift superintendents will be qualified SRO's.

I will correct myself. I mean shift supervisor, not shift superintendent.

BY MR. ADLER: (Resuming)

Q Let's say Incumbents D and G do not pass the exam. Will they still, in your criteria, criteria of having either the shift supervisor or the shift foreman in the control room at all times, will these two shift foremen be counted in that requirement? Or in their cases, would you require the shift supervisor to be in the control room at all times?

A (WITNESS HUKILL) In that case, we would use these people, with our rule that a shift foreman or a shift supervisor must be in the control room at all times. Again, we hope to have all these people qualified through this set of exams. And our only worry is that we will not get enough of them qualified at this time.

(Counsel for the Commonwealth conferring.)

BY MR. ADLER: (Resuming)

Q To your knowledge, is there any NRC requirement that there be an SRO in the control room at all times?

A (WITNESS HUKILL) I do not know the answer to that offhand. I do not think there is. There are certain requirements on handling fuel, but I do not know if there is

a requirement that an SRO be in the control room at all times.

Do any other members of the panel?

A (WITNESS ROSS) There is a requirement to have an SRO in the control room under certain conditions, those conditions being recovery from an unpredicted condition, like a reactor startup or something like that. There is a regulation about that will be initiated, that will specify what the manning requirements are and they are being specified.

Q In Licensee's management's judgment -- and all four of you can answer this -- do you believe that it is wise to operate the reactor without an SRO in the control room?

A (WITNESS HUKILL) We have -- you know, we have been operating this way for years and years. I think it is an appropriate move to go to the requirement that we have an SRO in the control room at all times.

With the startup of our training program and the people we have as shift foremen, until we can get them all qualified with an SRO license, I do not have any personal qualms about not having a, quote, "qualified SRO in the control room at all times."

Again, that is my goal. That is the way I am writing my internal instructions. That is where we intend

to go. And our draft deadline for being there is 1 July '82, although I have every intent of making that before startup.

I would, however, not recommend to the executive office that we not start up if we have not met that goal at that time, and I would not feel we were unsafe.

Q Are there any plans to have the shift technical advisers achieve SRO status?

A (WITNESS HUKILL) I do not know the answer to that.

A (WITNESS COLITZ) We said we would give them the equivalent of an SRO license, but we do not have any plans right now to personally send them for that exam. We don't see any requirement. We do not gain any benefit from that.

Q Can you expand on what you mean by the equivalent of that license

A (WITNESS COLITZ) The STA's have really been in training full time for the past year and a half on all of the plant systems, procedures, emergency procedures, transient analysis. They have been down to the simulator twice as a group. And as Mike previously said, they are now down for a third time with their crews.

And we have identified college level courses where some may be deficient. In other words, the electrical engineer may not have a college level nuclear engineering

course, or the nuclear may be short on an electrical engineering course. So we plan to get them this additional training.

So you know, I think they have certainly everything we have given the SRO and we have gone beyond that. But we have not committed to sending them for the license, since they do not direct the day to day operations of the operators.

Q Moving to page --

CHAIRMAN SMITH: Before you leave the SRO question, in your testimony you state that the various incumbents have, where appropriate, that they have obtained their senior reactor operator license. In each instance, are you referring to the senior reactor operating license for TMI-1?

WITNESS ROSS: Yes, sir, that is correct.

CHAIRMAN SMITH: Except I realize if there is going to be retesting -- never mind. It does not matter if they are current, because they are going to be retested.

WITNESS HUKILL: All our licensed operators, in addition to those new people that we want licensed, are going up for the exams, as I said, in late April. And whether they are licensed or not now, they have to go up and be relicensed in accordance with the NRC's order.

CHAIRMAN SMITH: Then the table of organization

shows that you, Mr. Ross, also own an SRO license. Will you be retested?

WITNESS ROSS: That is true.

CHAIRMAN SMITH: If we give you enough time away from the witness stand to prepare for it.

(Laughter.)

WITNESS ROSS: Yes, sir.

CHAIRMAN SMITH: Are you the highest -- will you be the highest official in the plant with an SRO license active, when you are retested?

WITNESS TOOLE: Yes, he will.

MR. SHOLLY: Mr. Adler?

BY MR. ADLER: (Resuming)

Q Moving to page 26, the rad waste engineer position that has recently been vacated. Have you been able to obtain someone in that position since you wrote the testimony?

A (WITNESS TOOLE) We are presently interviewing for that position. We have not filled it as of yet.

Q Do you expect that position will be filled prior to restart?

A (WITNESS TOOLE) That is hard to predict. To get the combination of the individual we need and have him accept the job -- we are going to make all efforts to fill that position.

Q Is it your position that this position need not be filled prior to restart?

A (WITNESS TOOLE) I do not believe this would have to be filled prior to restart.

(Counsel for the Commonwealth conferring.)

A (WITNESS HUKILL) I might just add that I concur with that, that this position would not have to be filled as a requirement for restart.

Q On page 34, you describe the number of employees in the preventive maintenance program, which is 24, and in the corrective maintenance program, which is 94. Is this an increase over the number of maintenance employees that were present prior to the TMI-2 accident?

A (WITNESS TOOLE) Prior to the accident, we did not have anyone designated as that, and the numbers are larger today than they were as a commitment to Unit No. 1 prior to the accident.

Q How much larger?

A (WITNESS TOOLE) The numbers there are almost the same numbers as were applied to Unit 1 and 2. So it is comparable to being twice as large.

(Counsel for the Commonwealth conferring.)

Q I would like to get back for a moment to the ability of senior management personnel to deal with an emergency at the plant. Now, as I understand it, operators

have been and are undergoing special training in emergency procedures.

Are the senior management personnel in the plant going to undergo any similar formal training programs in how to handle an emergency, what are the appropriate actions and so forth?

A (WITNESS HUKILL) The answer to that is yes.

Q Can you describe them?

A (WITNESS HUKILL) Well, I think maybe it would be better described in later testimony from the training department and in the emergency planning area, where they will go into detail on what training they are planning for us. I know I have a week or two of training to attend in the emergency planning area.

Q All right. If that can be better addressed by another witness, we will wait for that.

CHAIRMAN SMITH: Would you like to take --

MR. ADLER: I am finished with my questions. I would like to have time to confer with Mr. Dornsife on his.

CHAIRMAN SMITH: Let's take a mid-afternoon break of ten minutes.

(Recess.)

CHAIRMAN SMITH: On the record.

That is why you were looking nervously at the Reporter.

(Laughter.)

All right. Transcript 9997, Ms. Bradford had just requested to adopt Mr. Sholly's emergency planning contentions. You will recall that the Board recently denied that request with the exception of two emergency planning contentions. At that page I stated, "Mr. Sholly has made a request, and he will make that a formal motion," referring to Mrs. Bradford's request.

"That is perfectly appropriate. You can do that right now on the record, on behalf of ANGRY you wish to adopt the Sholly contentions, and we will have to give the parties an opportunity to respond to that, but you do not have to file anything in addition to that.

"If you have any arguments you want to make in support of that request, you can either make them now or file a paper on them. Your position is that you have an interest in his contention as well as he does."

Mrs. Bradford went on to say that yes, she is interested in all the contentions except those that relate to Cumberland County.

Then I stated, "I do not believe either the Licensee or the Staff is in a position to object or agree to

your motion. I just want to let it ride there. The motion is deemed made, and they can respond to it either according to the rules in writing or they can be addressed in the context of the meeting that you are going to schedule when you come to the Board and report."

Ms. Bradford points to that exchange as a reason to believe that she did not have to file anything in support of her motion and that the Board would postulate all of the possible arguments which would justify adopting that contention -- those contentions.

Is that your position, Ms. Bradford?

MS. BRADFORD: Yes, sir.

CHAIRMAN SMITH: And you feel by that exchange you were made to feel comfortable that you did not have to file anything further, that the Board would look at all of these arguments. So we agree that a rational reading of this could be as you stated. You could very well have reasonably thought that the Board had relieved you of any further arguments and that we would look into the merits of your request.

So we are going to allow you an opportunity to file the motion again in writing, and I recommend that you address fully the points raised by Mr. Zahler in the Licensee's response opposing your request to adopt those contentions.

MS. BRADFORD: Thank you, sir.

CHAIRMAN SMITH: Now, yes. You have had plenty of time to consider it, but --

MS. BRADFORD: I certainly had plenty of time to consider it. I have not had time to sit down at the typewriter. That is my problem.

CHAIRMAN SMITH: Let me say that from the period of time in which I led you to believe that you did not have to do anything until the time yesterday that you pointed out to me that you may have been misled, that will not count in timeliness; but other time now will count on the timeliness of your request. I urge you to just do it as fast as you can.

MS. BRADFORD: Thank you, sir.

CHAIRMAN SMITH: It is not appropriate for me to rule in the absence of the attorneys responsible for emergency planning what would be timeliness.

MS. BRADFORD: Some of these contentions of Mr. Sholly's relate to onsite testimony which I believe the Licensee and the Staff intend to file on February 9. And I do not know what their plans are as to whether or not they are filing testimony on Mr. Sholly's contentions.

CHAIRMAN SMITH: I suggest --

MS. BRADFORD: It may not make any difference to them. They may have already prepared it, or it may not be

possible for them to prepare it now.

CHAIRMAN SMITH: They certainly will have to be provided time to react to any change the Board makes in its order.

I also want to reflect the ex parte conversation that we had when you brought this to my attention, and that is, the Board will not take upon -- take the responsibility to analyze your contentions and see which are redundant and which are not. You are going to have to fully justify on your own --

MS. BRADFORD: Yes, sir, I understand that.

CHAIRMAN SMITH: You understand that.

Now, do you have any comment, Mr. Tourtellotte?

MR. TOURTELLOTTE: Yes, sir. We have been preparing our testimony on the basis of the Board's previous ruling, so we have excluded all consideration of those other contentions of Mr. Sholly; and I would only suggest that if ultimately the Board were to decide that those contentions were in, that we be given an appropriate amount of time to respond to them. But also perhaps some of the time for review of those contentions be at least held to a minimum.

I can foresee a problem. What we had originally planned was to file those on the 9th with the hopes that two or three weeks later we would begin to -- we would be able to commence hearing on those issues. And depending upon

when Ms. Bradford files her papers and we get our response to those papers and the Board rules, we may be in a situation where we have to tack it on to the end of the onsite proceedings or perhaps wait until we get to the offsite proceedings, and have a separate or at least start out those proceedings with a consideration of what is left over from the onsite.

CHAIRMAN SMITH: What I suggest, Ms. Bradford, isn't it possible for you to communicate directly while you are preparing your papers, communicate directly with Staff and the Licensee? For example, knowing what our attitude about duplicative contentions is, I assume you are not going to request us to allow you to adopt duplicating contentions.

Would that be a fair summary?

MS. BRADFORD: That is correct, sir.

CHAIRMAN SMITH: Can you identify the contentions quickly that you are going to ask to be adopted?

MS. BRADFORD: Yes, sir, I will be able to do that.

CHAIRMAN SMITH: Within the next few days work with the Licensee and the Staff, and then get your motion in very soon.

MS. BRADFORD: Yes, sir. I'd just like to point out that your ruling on my -- your ruling against my adopting Mr. Sholly's contentions was on January 27, which was only just a few days ago.

CHAIRMAN SMITH: I understand. I made an error. I handled it very poorly, and now I have to try to balance the damage I have caused. And I think some of the fault lies on you, too. You were given an opportunity. So we will share --

MS. BRADFORD: I lost a few days.

CHAIRMAN SMITH: All right.

MR. TOURTELLOTTE: I would also like some assurance from Ms. Bradford that she in fact intends to prosecute those contentions that she wants to pick up, because this requires a considerable amount of expenditure of manpower and effort; and I certainly do not want to be responsible for calling upon those services only to see that they are not really well spent.

CHAIRMAN SMITH: Well, we have had many discussions of that point. As a matter of fact, that was one of the points -- discussions I had last night with Ms. Bradford about contentions that she truly wishes to pursue, and effectiveness in the proceeding, and being spread very thin; and I think she understands that point.

But this particular point is, you do agree, don't you, that it would not be fair or serve any purpose to assert contentions and then abandon them. I mean simply they would not be followed. They would not be picked up.

We have already made the determination that the

Board itself does not require those contentions for a full record.

MS. BRADFORD: Yes, sir. And I have been thinking about your observation of yesterday and also about the rather lengthy hearing of yesterday on expediting the hearings, and I have something to say about the combination of that; that in the process of the fast pace -- to me it is a very fast pace.

CHAIRMAN SMITH: Yes, it is.

MS. BRADFORD: I think it is to other parties -- of this hearing, combined with the fact that a number of intervenors have dropped out, has left me in a position where a lot of contentions that ANGRY is serious about and concerned about -- I am only one person.

Class 9 is an excellent example of that. Ms. Weiss was going to handle that. I mean, we had a Class 9 contention. We were consolidated with UCS 13, and I really expected that UCS would be the lead intervenor on that case. And having only one working day to review the testimony and become an instance expert on Class 9 is a little more than I could do.

What I am really coming around to is the issues we have remaining. ANGRY has a contention on management that really relates to all of this, and yet, it is -- it is more than I can do to relate to management and emergency planning

at the same time. I should be home writing this, and I should be here listening to the witnesses.

CHAIRMAN SMITH: That's why I recommended you give serious thought to the issues that you wish yourself to pursue to be assured that the record is complete on and those -- you may have some priorities that you have to assess, and one of the considerations that you might make is to what extent is the Board taking an active interest in developing the record.

On some issues we have had very extensive cross examination, particularly on the one, the Class 9, the one you were concerned about. You did not hear it or you were not there for it, but if you read the transcript, you will see that there was a great deal of cross examination. There has been on management. As a matter of fact, there have been no intervenors, except for the question that you had yesterday, asking questions on management.

MS. BRADFORD: The Commonwealth has been.

CHAIRMAN SMITH: The Commonwealth, yes. That is the point I was going to make. The Commonwealth and the Staff and the Board have developed the record, so you yourself will have to make a decision on your priorities.

The Board has been trying to be accurate in telling intervenors when we believe a contention will be picked up by the Board and carried through and when we -- as

compared to when we believe it is an issue we must resolve.

I am suggesting you take that as one of the factors into account when you decide to allocate your time.

MS. BRADFORD: I guess I would like to ask along those lines -- I do not know whether you can answer immediately, but just taking an example, if there were no intervenors on emergency planning, if we just dropped 132 contentions, aside from the fact that the Staff and the Licensee would be very relieved to hear this at the moment, what would the Board's interest be?

CHAIRMAN SMITH: Of course we have a very strong interest in it, but as we stated before, we have not yet seen the testimony. We do not know to the extent it has been covered by the staff and by the witnesses that are coming before us, but we do have a strong interest in it.

Now, one of the things that is not well understood is can our interest go down to the planning -- to the emergency planning of all five counties and every one of the townships within those counties and every one of the boroughs within those townships? That is the problem, isn't it?

And that is one of the functions of intervention in our proceedings. We can look at the emergency planning programs in the context of the broad public interest. If you have a particular interest representing your group, then

that is why our intervention process provides for you to pursue your interest in our proceeding.

You may do that. The Board may or may not necessarily do that.

MS. BRADFORD: I guess I am just acknowledging that I do not really understand how much interest the Board would be able to take or how much cross examination the Board would be able to do.

CHAIRMAN SMITH: We have discussed our limitations on the record before, and we discuss them now. It is not only a question of interest but a question of knowledge of the local circumstances. This is where -- emergency planning is where local intervenors can be particularly helpful as compared to highly technical issues which are common throughout the industry and the nation. But this is where I think there is particular opportunity for residents in the area to be helpful.

But identify the area where you can be helpful, where you can be an expert, and my recommendation is to concentrate on those if you find your resources are too limited.

MS. BRADFORD: Yes, sir, I will do that. I would just like to be clear on the record that my doing that does not mean that we are not interested in other areas. I felt that there has been some note that we should be criticized

for not being fully prepared on Class 9 or something like that.

CHAIRMAN SMITH: What we are asking is you be candid with the Board and the parties when you have a contention you wish to pursue. If you are going to abandon one, okay. We in turn will be candid with you and all intervenors as to how we regard the contention and the extent the Board will insist that the issue be resolved.

If you have particular questions, we will try to answer them. You already asked about emergency planning. We could not give you a very good answer. We have done that. We have consistently adopted contentions that the parties have tried to drop, and you are aware of that, Class 9 being one.

MS. BRADFORD: Yes, sir.

CHAIRMAN SMITH: So you make motions, you make requests, you just ask for information, and we will try to tell you when that is the case.

MS. BRADFORD: Can I ask how interested you are in management?

CHAIRMAN SMITH: We are very interested in management.

MS. BRADFORD: I thought so.

CHAIRMAN SMITH: Yes. And I commend to you the transcript of the proceeding if you have any question about

that.

MS. BRADFORD: The other part of my thought which relates to the discussion of yesterday is that it is my strong observation that the accelerated pace of the hearing has already in effect damaged our case in that we are just not as able to assist the Board in assembling a full and complete record because of the accelerated pace of the hearing, and any further acceleration is only going to make our participation that much less.

CHAIRMAN SMITH: I think you made that eloquently clear yesterday, and I understand your problem. It is a very difficult problem to try to take upon the burden that you have being a person alone. We understand that.

But that in itself cannot control the timing of the hearing. There is a very broad public interest beyond just yours. We take that into account to the extent that we can, but we have to balance all of the factors.

MS. BRADFORD: I understand that, sir. I just remember your saying yesterday that the interests of the parties were controlling interest in this case.

CHAIRMAN SMITH: What I said yesterday, although we were discussing possible ways of expediting the hearing, the controlling factor is a complete and fair record.

MS. BRADFORD: Yes.

CHAIRMAN SMITH: That is our overriding

requirement in every hearing, to assure that expedition does not overcome and defeat due process.

MS. BRADFORD: Yes.

CHAIRMAN SMITH: That is the test always.

MS. BRADFORD: Thank you.

CHAIRMAN SMITH: Okay. Anything else? You file that. I suggest you get that in this week.

MS. BRADFORD: Yes, sir.

CHAIRMAN SMITH: All right.

Mr. Trowbridge, I have not given you much opportunity to comment here. I thought it was something on the Board's own motion that we had to correct because --

MR. TROWBRIDGE: I understand, Mr. Chairman. We hope to receive very promptly -- it would be an assistance if we received it here at the hearing room or in our support room so it can get by telecopy to Mr. Zahler or myself in Washington.

MS. BRADFORD: Yes, sir.

CHAIRMAN SMITH: Okay.

MR. ADLER: Mr. Chairman, I would just request that Ms. Bradford also notify the Commonwealth of those onsite contentions that she planned to have reconsidered. It is coming up in less than three weeks.

MS. BRADFORD: Yes.

CHAIRMAN SMITH: With respect to other contentions

that you have other than emergency planning -- and I at the moment do not have a list of what they are. I know that you are still in management, but do you affirm that you still wish to prosecute those contentions?

MS. BRADFORD: As far as I am aware, I think the only contentions we have remaining are emergency planning contentions and our one ANGRY 4 on mangement. And I intend -- and I think this is a change from what I told you on January 15. I just do not see how I can be here in the hearing a take an active cross examination on management.

I do intend to review the record and see what I can do with that, but I do not --

CHAIRMAN SMITH: That covers a broad area of management which is covered by the Board.

MS. BRADFORD: Yes, sir. And I may have some specific areas of cross examination of particular witnesses, and I am not sure where it is going to come up in the testimony they present on management or on financial. I think it is their testimony on management.

CHAIRMAN SMITH: All right.

MS. BRADFORD: But that is the only area of cross examination I have wanted to pursue so far in management.

CHAIRMAN SMITH: All right.

MS. BRADFORD: So I do not expect to be taking a very active, visible presence on management issues.

CHAIRMAN SMITH: All right.

Do either Mr. Trowbridge or Mr. Tourtellotte have any questions of Ms. Bradford about other contentions that you would like to have her commitment on or position on?

MR. TOURTELLOTTE: No.

MR. TROWBRIDGE: Subject to correction by Mr. Blake, the management area we have already addressed whatever contentions were around, whether they were abandoned or not now. Our testimony is in.

CHAIRMAN SMITH: Okay.

Mr. Tourtellotte.

MR. TOURTELLOTTE: No.

CHAIRMAN SMITH: Okay. Okay. Thank you, Ms. Bradford.

MS. BRADFORD: Thank you, sir.

CHAIRMAN SMITH: Do you have any further questions?

BY MR. DORNSIFE:

Q I first would like to ask a couple of additional questions on chain of command during emergencies. And I realize this may come up again during emergency planning, but such an eminent panel as yourselves may not be here; so I would like to get these questions on the record now if I could.

Mr. Ross, I believe you had said that there will be a technical team that will meet during an emergency and

decide, I believe -- I don't know if you characterized it this way, but the proper course of action and then relay your recommendations to the emergency director, is that correct?

Is that a fair characterization of what you said?

A (Witness Ross) I think the characterization was more of the crew concept, and we would do things as a crew and have input from a technical support center.

Q You would have input from a technical support center?

A (Witness Ross) Yes. Lacking input, we would take the actions we were trained to do.

Q Who would be in charge of the technical support center making these recommendations for these actions?

A (Witness Colitz) Presently right now on our callout list I have designated my three lead engineers, three sections. In one area it is the mechanical, in the other area it is the electrical, in the other area it is the I&C engineers. They would be the initial response depending on what duty week it was to the technical support center, if the technical support center had to be manned.

Q Did -- how much feedback would you get from, say, the emergency director and people higher up in management before you took some of these actions? I assume you would do all the things in the emergency procedures, and then if

you ran into problems you may look for additional help.

How would you interface with the emergency director and who would -- how would this information get back and forth?

A (Witness Ross) Mr. Dornsife, our emergency planning group will address that, but I will just briefly say that we are staffed such that we have a couple of layers of additional management in the control room who are licensed. Those licensed people will be making decisions on the plant itself. When we have additional need for outside assistance, we have a direct tie to the technical support center which is tied to B&W and our tech support personnel back in Parsippany.

We would keep the emergency director informed of the plant status and let him know that we are seeking outside help and let him interface somewhat on that. The emergency director's perspective is to be broad and make sure the emergency plan is being carried out in its entirety.

Q At what level would information be disseminated to the NRC and the state, for example? You would not be sending rough information, I assume. It would be filtered to some extent. Who would be making the decision of what information should go to the offsite agencies?

MR. BLAKE: Mr. Chairman, objection. I have tried to avoid getting involved with these panels, but this

peculiarly is a subject matter in the hearing. It is going to be addressed in emergency planning, and we have witnesses who are going to talk about it. It is not in their direct testimony.

CHAIRMAN SMITH: That is right.

Mr. Dornsife observed that, and he was somewhat requesting the opportunity to address some particular concerns because of the availability of this particular panel. If you feel you cannot afford him that opportunity, we will consider your objection.

I do think, however, you ought to --

MR. DORNSIFE: I am not going to pursue it much further.

CHAIRMAN SMITH: Well --

MR. BLAKE: I actually jumped in at that point because we were getting to specific offsite notifications and who is going to make them, and we are starting to get into fairly --

CHAIRMAN SMITH: Okay. He is almost done. Let's wind it up.

BY MR. DORNSIFE: (Resuming)

Q I was not talking about offsite notification. I was talking about information level. At what level will the information be decided -- who will make the decision of what information will be given to the offsite agencies as far as

routine reporting information?

A (Witness Toole) We will have a line established to the Bureau of Radiological Protection; that would be into the level of our health physics expert who is coordinating that area and responsible to the emergency director. In addition, we will have an open line to the NRC. Additionally, we have provisions for the NRC to be in the control room and in the shift supervisor's office.

Q Who will be making the decisions as far as protective action recommendations?

A (Witness Toole) That would be the emergency director.

Q But he will base his decision -- Mr. Hukill, you will base your decision on what your technical people are telling you, is that correct?

How much independent assessment will you make at your level?

A (Witness Hukill) I would base my decision not only on what the technical people are telling me but what my operators are telling me, for example, Mr. Ross who at that point would probably be in directing the operation of the plant itself, and I would be controlling the flow of information to the NRC and other agencies from that information that I received.

Q What type of criteria will you use to base those

protective action recommendations on?

A (Witness Hukill) Again, we are getting into the details of the emergency plan, but right now the emergency plan and our emergency procedures have definite criteria of what the levels are, and when you go to the various levels of the emergency plan. And they are very clearly spelled out in our procedures, and I would pick up the procedure and read what step I was in and what level I would have to go to.

(Counsel for the Commonwealth conferring.)

Q I understand a lot of this is covered by procedures, emergency plan procedures, but I guess I am asking you because you are uniquely responsible; if I may, you are where the buck stops as far as protective action recommendations are concerned, and I'm wondering what your philosophy is concerning that particular type of recommendation, whether you are strictly going to be guided by procedures or whether you have some philosophy that is going to determine your decision.

I don't know whether you are going to be here for emergency planning again or not.

A (Witness Hukill) I am not scheduled for emergency planning. But first, you have to remember that the emergency director initially at the time of an unusual occurrence or unusual event is the shift supervisor. It is not me. And I am only on on a one and three basis. I am

not the emergency director every day of every week. So there are other people involved. And yes, we have action guidelines written in our procedures now which I told you we are going to be trained on and which I have already been through a number of them.

But I think you also -- you know, I would look at my radiological expert was telling me, and what he is telling me that our potential is for outside exposures; and I would base my actions both on what the procedures say and the other information I have received.

Q How about plant status? How would you factor that into your decision for protective action?

A (Witness Hukill) Well, if I had a report that whatever the casualty is is under control, and the plant is under control, and they are proceeding to either hot shutdown or cold shutdown condition, you know, I would use that as a basis -- as another judgment factor in the decision that I made.

I am not sure I am answering your question.

Q I guess I was not looking for a hard and fast answer. I was just trying to probe what your philosophy was concerning these particular recommendations, because as you realize, they are extremely important to the state, the Commonwealth, and the public.

A (Witness Hukill) I understand that, yes, sir. And

my philosophy would be that you cannot write everything in a procedure, and we do have procedures up there to follow, but based on my experience -- and you understand that for years I have been the guy who has had to make the decision -- and I look at my experts, those sitting here at this table, and to the people who would be in the control room at that time, probably Mr. Ross, his input, the input from the radiological control expert who is going to be onsite in the control room at the time, and the input from Mr. Colitz's group in the technical support center, who is also getting input from B&W and from our technical staff in Parsippany.

And I would put all those together before I made a decision as to what I would recommend to the state and what I would recommend to the NRC.

Q You had said previously that you may not be the person in charge initially, but I assume you would be called as soon as possible and take responsibility as soon as you arrived, is that correct?

A (Witness Hukill) There is not any question that they would get a hold of me as soon as possible, and I would be in there, as would everyone sitting at this table. The only reason that we really are on a one and three rotation right now is that in case one of us is out of town or otherwise indisposed, we have someone who is on -- a watchbill, as such, who is required to be in the area.

The person on the duty roster or watchbill, as I mentioned, is required to be in the area and be on call within an hour. And if for some reason he has to go out of town or something like that, he has to get a replacement on that duty roster so we have an emergency director assigned and available.

(Counsel for the Commonwealth conferring.)

Q Would you characterize your experience in the Navy as one where your ultimate responsibility was to the public, public health and safety rather than -- rather than to safety of the ship and the crew?

How would you compare your responsibilities now compared to what they were in your naval experience?

A (Witness Hukill) I would think I would have to break that into really two separate categories. For example, if the ship is at sea in the middle of the ocean, my responsibility is obviously for the safety of the ship and the safety of the crew.

There was an entirely different concept as far as I was concerned when the ship was in port, and when the ship was in port my primary responsibility and emphasis and concern was the public health and safety, without any question. The ship and operating the ship never came before that at any time in port when I was in command or for that matter when I was in Admiral Rickover's office and

responsible for a number of ships and their plants.

BY MR. ADLER:

Q Mr. Hukill, do you have any experience in judging the magnitude of releases from a commercial nuclear power plant under various plant circumstances?

A (Witness Hukill) No, not really. I have had our expert in my office teaching me, and that is part of what I assume I am going to get in the emergency planning training.

Q And similarly, you don't have any experience, do you, in combining that estimate of release with the meteorological conditions and the demography of the area and putting that all together into a public health recommendation, do you?

A (Witness Hukill) No. I have no experience in it, but again, I had our expert, Mr. Dubiel, come over to my office and spend three hours with me going through that. And I foresee that as one area that I have to train in.

I might also just mention that Mr. Toole reminded me that either Mr. Dubiel or somebody equally well trained and qualified is going to be in the control room with me. I still feel that I have to have that knowledge equivalent. I cannot just blindly take faith in what he says. I have to be trained and knowledgeable enough to evaluate what he is telling me.

BY MR. DORNSIFE: (Resuming)

Q In your testimony, I believe in oral and written testimony, you stated that the shift foreman, supervisor, and the control room operators under their license authority have the authority to shut down and cool down the reactor if they believe that the safety -- there is a safety problem. Is that correct?

A (Witness Hukill) Yes, sir, that is correct.

Q What -- do you conceive of an example where there could be some conflict where one operator believes that in the interest of the safety of the plant it should be shut down and the supervisor does not think so? What happens in that case?

A (Witness Ross) First of all, I cannot conceive of that ever happening. I never have had a case in some 20 years. If it did happen, it would be dealt with as it does in any change of command. It would be pushed up through the chain of command.

Q But if the operator you say has the authority on his own, if he would commence shutting down the plant on his own authority and somebody else did not believe that was in the best interest of the public health and safety or the safety of the plant, what would occur then?

A (Witness Ross) Clearly --

MR. BLAKE: Mr. Chairman.

CHAIRMAN SMITH: Mr. Blake.

MR. BLAKE: I have observed a couple of different representatives of the state questioning the panel. I am afraid we are getting into precisely what occurs when two different people from the same -- it is the same types of questions which I think were earlier asked by the other individuals.

CHAIRMAN SMITH: We were just discussing that up here. It seems like I am seeing the same movie over or something.

MR. ADLER: Mr. Chairman, I briefed Mr. Dornsife on the fact that I asked questions regarding the independent authority to shut down the plant, and the area I did not cover was what would happen if there were a conflict within the control room, and that was the only area that Mr. Dornsife wanted to go over again.

CHAIRMAN SMITH: Okay.

MR. BLAKE: My recollection is that a question very similar to that was asked. It sounds to me pretty much the same.

CHAIRMAN SMITH: We will find out the answer before we resolve the debate if we just allow the answer to be given.

Go ahead. Answer it.

WITNESS ROSS: I think Mr. Hukill has already answered the question. The guy that takes an imprudent

action and shuts down inadvertently is going to be responsible for his action from a management standpoint. If we have the conflict that the supervisory personnel is charged with the on the spot overall safety of the plant, the supervisor would step in and stop that confrontation.

WITNESS HUKILL: I again want to re-emphasize that the operators have the authority and responsibility to shut down the plant if in their mind such action is required for the public health and safety, and that once the operator starts shutting down the plant, I cannot conceive of anyone in the plant coming in and saying no, stop and restart.

Number one, physically that is almost impossible. And number two, it just would not happen. An operator has made a decision. We might question that decision afterwards, and we might well take him to task for that decision. But he has that responsiblity, and he has the authority to do it. And once he has made the decision to do it, the plant is going to be shut down.

And I guess I would add I might question his judgment, but I would never question his authority.

(Counsel for the Commonwealth conferring.)

BY MR. DORNSIFE: (Resuming)

Q On page 26 of your testimony you talk about the rad waste organization, and it is not clear to me whether you say you have three rad waste foremen and 20 rad waste

workers. Will these people be on a shift basis or on a call basis, or how will they interface with the operating crew?

A (Witness Ross) Mr. Dornsife, we do have three rad waste foremen, and we do have approximately 20 utility workers assigned to them. Presently the rad waste people are on basically a two-shift assignment; they are working two shifts a day. And of course, as with all of us at a station, they are also on call.

Q When you say two shifts, does that mean the back shift does not have a rad waste crew?

A (Witness Ross) We have a crew assigned 7:00 to 3:00 and 3:00 to 11:00. We have not demonstrated any need to have anybody assigned to 11:00 to 7:00. What these people really are doing are processing barrels, properly labeling, properly cleaning areas, de-conning areas.

Q So they do not operate the equipment in the plant, the rad waste equipment in the plant.

A (Witness Ross) The actual operation of the rad waste equipment, the evaporators and such, are done by the on shift operators.

Q So the on shift operators in case of an emergency, need for emergency operation of rad waste equipment, could be done by the auxiliary operators.

A (Witness Ross) Not only would it be done in an emergency, it would normally be done by them.

(Pause.)

Q A similar question on page 50 for the chemistry technicians. It says they are on a shift basis. I am just wondering how they interface with the operations department. What equipment -- do they just operate the sampling equipment, or do they operate other equipment, and how do they interface their operations with the Operations Department?

A (Witness Colitz) The Chemistry Department technicians on the back shift basically sample and analyze. They basically do not really operate any equipment. If chemical additions had to be made as a result of some samples indicating, you know, that type of addition had to be made or if something was out of spec, they would flag this to the shift supervisor or shift foreman. So on back shift they are tied directly into the shift foreman or shift supervisor who would follow up and take corrective action.

Q How about other shifts? Are they any different?

A (WITNESS COLITZ) Well, the day shift, since the chemistry supervisor and foreman are on day shift, they may discuss it with them first before they go directly to the shift supervisor or shift foreman.

Q So basically what you are saying is the chemistry people would not come to the control room and the operations people and ask to take a sample. The auxiliary operators would line up to take the sample for them. They would just do the analysis.

A (WITNESS COLITZ) In some cases, I think in most cases the technician himself takes the sample because the sample racks are down in his chemistry lab. He may have to have the operator open a valve or two.

One other thing, on the back shift, too, if they do run into problems or something they do not understand, a lot of times they will call the chemistry foreman or supervisor before they go up and bring the problem or the request for action to the shift supervisor or shift foreman.

We do have the chemistry supervisor, foreman, people on call on the three-shift type thing.

MR. DORNSIFE: I have no more questions.

CHAIRMAN SMITH: Mr. Swanson.

MR. SWANSON: I am aware the Board has required the filing of cross examination plans, and unlike the

Commonwealth, whom I am sure has filed one on this panel, we have not because we did not anticipate any questions; but since we started, the staff has come up with two very specific areas in which we have one or two questions.

CHAIRMAN SMITH: Yes. The rule that has been applied has been that if you have cross examination on the direct examination, you must file a cross examination plan, but there is no plan, of course, required for testimony developed beyond the direct examination.

MR. SWANSON: Okay. I guess it might be questionable whether or not it is direct or oral. Anyway, they are very specific and I will identify each.

BY MR. SWANSON:

Q The first deals with page 15, a sentence in the top paragraph, and Mr. Hukill or anyone on the panel can answer this. It reads: "Administrative functions that detract from or are subordinate to the primary responsibility are delegated to other personnel;" and simply all we want to know is what administrative functions generally are you talking about? And secondly, what are these personnel that are delegated the responsibility referred to?

A (WITNESS ROSS) Administrative duties of the shift supervisor, as I am sure you are aware, sir, there was a study undergone, and those types of duties that were

delegated away from were him assigning time sheets, assigning RWPs, administrati.. duties that do not have anything to do with the operation or safety of the plant.

Q The second part of the question is who they are delegated to. Is that personnel within the same group or are they shifted outside the office?

A (WITNESS ROSS) There is a combination of that. Some of the duties have been delegated to clerks where it can be done. In the case of, for instance, a time sheet where the people work the backshift, it has been delegated to a management person, and that would be the shift foreman.

(Pause.)

Q Radiation work permits. The responsibility for processing them, was that shifted outside also to other personnel?

A (WITNESS ROSS) That is not outside in that the radiation work permit is tied directly to work done within a controlled area of the plant, including safety related equipment. That duty is not necessarily that of a shift supervisor, but the shift foreman does assign radiation work permits.

Q The other question I had deals with Mr. Toole's testimony on page 33. Well, it is actually in that section. It is more than one page. He describes the experience and qualifications of both the preventive and

corrective maintenance manager. He indicates they have extensive experience in instrument and electrical engineering, and I was wondering if these gentlemen also have extensive experience in the mechanical end of nuclear maintenance.

A (WITNESS TOOLE) I think both individuals have a working knowledge that is satisfactory for performance of mechanical maintenance. Their discipline has been I&C for the majority of their career, but mechanically I believe they have a good functional knowledge of the workings of the mechanical department.

Q Is this work knowledge, to your understanding, the result of on-the-job experience as opposed to formal, technical -- scholastic training?

A (WITNESS TOOLE) It would be more experience than training. The position is one of directing an individual responsible for the mechanical department itself. The PM supervisor and the CM supervisor each has a mechanical supervisor responsible to him.

MR. SWANSON: We have no further questions.

CHAIRMAN SMITH: Mr. Swanson, also if you should observe that you have overlooked the need for cross examination on direct examination, circumstances where you would have filed a cross examination plan and you make a representation to that effect, certainly we will not let the

record be void on that account.

MR. SWANSON: I appreciate that. If that event does arise, we will try to identify in advance what our goal is then in questioning in that area.

BOARD EXAMINATON

BY DR. JORDAN:

Q Could you briefly tell me the requirements with respect to education for the shift supervisor, the shift foreman and the reactor operators?

A (WITNESS ROSS) I think it would be easiest to start with the reactor operator. The reactor operator requirements are: one, he must be a high school graduate. We prefer him to have a strong background in math and physics. He must also have at least 2-1/2 years experience as a power plant operator and one year experience at the station.

In the case of a shift foreman --

Q On the reactor operator, first, is he given special training in fundamentals as part of the job?

A (WITNESS ROSS) He is given special training in fundamentals. It comes in a variety of ways. One way is if he is in the mode of progression that we have at the plant where a person is an auxiliary operator first. He has a definite prescribed training program he must accomplish, and he has a time and testing requirement to advance to that

grade. Our normal control room operator is a product of that chain.

He then must, once he becomes a control room operator, go into additional training-type classes, and the program is approximately nine months long. At the end of that program, of course, is an evaluation by our own management of his capabilities, and then a final evaluation of his capabilities by NRC in the form of a licensing exam.

Q Does he have something done like the requirements for -- I mean he has met the educational requirements perhaps of a two-year, what is it, technical degree? Do you think it is somewhat equivalent to that?

A (WITNESS ROSS) I think it is at least equivalent to that, yes, sir.

Q Very well. Now go ahead on the foreman.

A (WITNESS ROSS) Shift foreman requirements basically are pretty much the same. When we get a shift foreman we look for a person who is capable of directing the activities of others, and that is one of the requirements of an SRO. We also prefer him to have at least a year's experience as a reactor operator. He must successfully pass an SRO exam. That is the way we are heading in our mode.

Q What?

A (WITNESS ROSS) He must pass an SRO exam to become a shift foreman. That is the way we are headed at this

present time. Basically our requirements of that RO at a demonstrated capability in management, if you will, or aptitude for it, and the responsibility and attitude that is befitting a shift foreman. I think that is very important.

Q But still, high school graduation.

A (WITNESS ROSS) Yes, he must meet all the requirements.

Q That is all that is required, a high school degree?

A (WITNESS ROSS) That is correct.

Q Now then, the shift supervisor.

A (WITNESS ROSS) His requirements are pretty much the same as the chain he came up through, but we treat this individual as a very special guy. He is the guy that is going to be in charge of the station when nobody else is there, so we look at a demonstrated management capability also. He must have been a shift foreman someplace.

He must have shown an aptitude and he must be capable of operating the plant and directing other people. His basic educational requirement is still that of a high school graduate.

A (WITNESS HUKILL) If I might mention, in the case of the shift supervisors we presently have over 50 man years of experience on TMI-1 incorporated into our six shift supervisiors today.

Q Mr. Hukill, then, as a graduate of the Navy's

program, are you comfortable with having high school graduates operating these plants?

A (WITNESS HUKILL) With what I have seen of our shift supervisors since I have been there, I am extremely impressed with them, and yes, I am comfortable with them without the college degree today. I do think and I do agree that the industry has to move forward to get more highly educated people in these positions.

I look at the STA today to represent that on shift and to give me that confidence that I have a degreed engineer on shift providing that backup to our shift supervisors, and I think that is a good program. But in the long run I know we are going as an industry to the point where we are going to require more college-level education for our people.

Q But at the moment, then, you say that having the shift technical advisor who is an engineer there is an important factor.

A (WITNESS HUKILL) Yes, sir.

BY DR. LITTLE:

Q Another way to get college graduates is to allow the people who are already employed the opportunity to on a part-time basis meet the requirements for a degree. Is there any program now in place or envisioned to do this, either on-site or off-site?

A (WITNESS ROSS) Dr. Little, yes, there are programs presently. Many of our people are attending courses. I myself am attending courses that have been set up by our training department. There are so many moves on in that particular area that I would not want to comment any further.

They are looking at every possibility of getting additional education for our on-shift people at this time. We have taken nuclear engineering courses during the summer from a college professor from Penn State. There are many areas being covered like that right now.

BY CHAIRMAN SMITH:

Q Are you, Mr. Ross, yourself headed toward a degree?

A (WITNESS ROSS) Yes, sir, I am.

DR. JORDAN: Just one moment.

(Pause.)

BY DR. LITTLE:

Q I do have one. We noticed one person was not listed as being a high school graduate. We did not know if that was intentional or not. I forget which one it was. But do you require a high school diploma or an equivalent, what is it, the GED? Is passing the GED considered the same?

A (WITNESS HUKILL) Are you asking is a high school GED equivalent to a high school graduate? Is that the question?

Q In your organization, yes.

BY DR. JORDAN:

Q I believe Incumbent F was not a high school graduate.

A (WITNESS HUKILL) I believe a high school equivalency is equivalent to a high school diploma.

Q Let's see, maybe it was Incumbent F that I could not, on page 21. At least I have a note that he is not a high school graduate. Am I wrong about that?

A (WITNESS ROSS) Incumbent F, just by looking at his qualifications, I know the gentleman as having graduated from the Navy school. I would have to guarantee he is a high school graduate or at least equivalent.

A (WITNESS HUKILL) If my memory serves me correct, you could not get in the Navy Nuclear Power Program without being a high school graduate.

Q Okay, good.

A (WITNESS HUKILL) We will certainly check on that.

BY DR. LITTLE:

Q I wondered if that was an error of omission or commission.

BY CHAIRMAN SMITH:

Q If you add up the years in Navy schools, he will almost have spent the equivalent amount of time.

A (WITNESS ROSS) Yes, I agree.

A (WITNESS HUKILL) He went to the U.S. Navy Electronics School, and I am certain he could not pass that school without a high school education.

BY DR. JORDAN:

Q You, Mr. Hukill, did work directly with Admiral Rickover.

A (WITNESS HUKILL) Yes, sir, I did, for almost four years.

Q How did you stand up?

(Laughter.)

A (WITNESS HUKILL) I am still here, sir.

(Laughter.

Actually, when I left command I thought I could never have as a challenging a job again, and I found out there are more challenging jobs.

(Laughter.)

DR. JORDAN: I see. I will not inquire what you mean by challenging.

That is all the questions I have.

CHAIRMAN SMITH: Do you have redirect, Mr. Blake?

MR. BLAKE: No.

CHAIRMAN SMITH: Anything further of this panel?

(No response.)

Thank you very much, gentlemen.

(The witnesses were excused.)

CHAIRMAN SMITH: There is confusion. Are we to be given Mr. Wilson or Mr. Clark in the morning?

MR. BLAKE: Just one item here. I think I can represent to the Board that it was just a matter of omission on Incumbent F. It is pointed out to me that in the Restart Report that Incumbent F is identified as a high school graduate.

CHAIRMAN SMITH: We thought you were just testing the Board.

(Laughter.)

MR. BLAKE: The next witness is Mr. Wilson on Technical Functions. I don't know whether to get started today on him. Did you indicate already which was going to be the next witness tomorrow morning?

DR. JORDAN: That is what I said.

MR. BLAKE: That is what I thought.

CHAIRMAN SMITH: I don't see why we shouldn't get him in. We can at least get ready for cross examination. We might just as well use the time.

MR. DORNSIFE: Mr. Chairman, if it will help any, we have no proposed cross examination for Mr. Wilson. We have no questions for him on direct.

CHAIRMAN SMITH: Well, we have -- many of the questions that are asked one panel you do not have to ask the succeeding panels, but why don't we go until a

reasonable time and see what happens.

MR. BLAKE: The reason I was asking, and in fact, I was going to try to get a check at the end of the day, was Mr. Clark is in Colorado representing the company, and I was going to get on the phone and call to him and try to get him back here by tomorrow.

I would like just five minutes to talk to Mr. Wilson and see whether or not he could wait over until tomorrow until we get more organized, and I would like to talk to the NRC staff about the possibility of their folks being ready tomorrow, and then I will go to the phone and try to find Mr. Clark in Colorado.

CHAIRMAN SMITH: All right. Do you want to take a break for that purpose? In any event, Mr. Wilson is going to testify tomorrow.

MR. BLAKE: He is the next fellow on tap.

CHAIRMAN SMITH: Why don't we just take -- unless you think you have to make your phone call now -- we might just as well adjourn for the night if you are ready.

All right, we will adjourn until 9 a.m. tomorrow.

(Whereupon, at 4:40 p.m., the hearing recessed, to reconvene at 9:00 a.m. the following day, Thursday, February 5, 1981.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: METROPOLITAN EDISON COMPANY (TMI UNIT 1)

Date of Proceeding: February 4, 1981

Docket Number: 50-289 (Restart)

Place of Proceeding: Harrisburg, Pa.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

David S. Parker

Official Reporter (Typed)

Official Reporter (Signature)