NUCLEAR REGULATORY COMMISSION

ORIGINAL

BEFORE THE ATOMIC SAFETY & LICENSING APPEAL BOARD

In the Matter of:	:	
	:	
METROPOLITAN EDISON COMPANY, et al	:	
	:	DOCKET NO. 50-289
(Three Mile Island Nuclear Station	:	(Restart)
Unit Number 1)	:	

ORAL ARGUMENT

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UNITED STATES OF AMERICA

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

4350 East West Highway
5th Floor Conference Room
Bethesda, Maryland

Wednesday, September 1, 1982

The oral argument in the above-entitled matter was convened, pursuant to notice, at 9:30 a.m.

BEFORE:

GARY J. EDLES, Administrative Judge
DR. JOHN H. BUCK, Administrative Judge
DR. REGINALD L. GOTCHY, Administrative Judge

APPEARANCES:

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C O N T E N T S

P R O C E E D I N G S

(9:30 a.m.)

JUDGE EDLES: Please be seated. Good morning, ladies and gentlemen. Today, we hear orgal argument in the design phase of the Three Mile Island Restart proceeding. The order of appearances and the time allotments are as shown on the printed sheets which are available at the counsel table.

I will ask each counsel please to introduce yourself formally for the record, and in the case of UCS and the Licensee, to indicate whether you wish to reserve any time for rebuttal. We will start with UCS, please.

MS. WEISS: My name is Ellyn Weiss, representing the Union of Concerned Scientists. I am with the law firm of Harmon and Weiss in Washington.

JUDGE EDLES: Would you like to reserve some of your time, Ms. Weiss?

MS. WEISS: I would like to reserve 20 minutes, Judge Edles.

JUDGE EDLES: Fine. Counsel?

MR. BAXTER: Mr. Chairman, appearing for Licensee, I am Thomas A. Baxter of the law firm of Shaw, Pittman, Potts & Trowbridge in Washington, D. C. With me today, also appearing for the Licensee, is George F.

Trowbridge of the same firm, and Mr. Robert E. Zaylor, who as we had indicated will be available if there were any inquiries by the Appeal Board on the separation issues. I would reserve five minutes of my time for any rebuttal on Licensee's exception.

MR. CUTCHIN: I am James M. Cutchin IV, and I represent the NRC Staff and I am with the Office of the Executive Legal Director of the Nuclear Regulatory Commission.

JUDGE EDLES: Okay, we will begin with Union of Concerned Scientists.

MS. WEISS: Judge Edles, I see you have the podium up there. I would request that you may permit us to conduct this argument from our seats, given the fair amount of time and the number of papers involved, and also, because I anticipate that Mr. Pollard may be required to answer some of the technical questions.

JUDGE BUCK: We do not have microphones down there.

JUDGE EDLES: Is that going to pose a problem?

THE REPORTER: Yes, sir.

JUDGE EDLES: That will pose a problem for the reporter. Why don't you come to the podium, and to the extent we have to, we can give you a little additional time to go back and collect up your notes. But it does

make it hard for the reporter.

ORAL ARGUMENT ON BEHALF OF INTERVENORS

BY MS. WEISS

MS. WEISS: Judge Edles, Judge Buck, Judge Gotchy, there is a lot of ground to go through here, and I assume that you have got many questions. I will try to make my prepared remarks relatively limited and leave most of the time to address your questions.

I have a few general comments to make at the outset. I think an attempt has been made throughout this proceeding to paint the Union of Concerned Scientists as extremists, as people who are alone in their technical views, as people whose technical views are unreasonable, and as people who hold views which it is warned, if adopted, would apply to many other plants and, it is implied, would cause great problems for the nuclear industry.

It is true that during some days of these hearings I felt very much alone, and at some points in reading this decision. But as I reviewed the case in preparation for argument today, I was struck again by the fact that the predominant pattern of the UCS contentions and of our evidence was simply to take a problem that was identified by the Staff itself in the aftermath of Three Mile Island, in the short-term Lessons Learned report, NUREG-0578, and to suggest that

the short-term solution identified therein was not by itself sufficient to solve the problem identified.

In many cases, these short-term fixes were even stated by NUREG-0578 to be just a first step in addressing a problem which required specific later steps. That is explictly the case with the PORV and with the pressurizer heaters, where the Staff said it is necessary to assess whether these pieces of equipment should be upgraded to safety grade, and that is also true of the systems interaction. The problem in our view is that the next steps never got taken.

There is a very illuminating point, I believe, in the testimony of Mr. Conran, a Staff witness on UCS Contention 14, with respect to this point. When he was asked, how was the decision made not to go to full safety grade on particular pieces of equipment, he acknowledged that no analysis was done of what would be required to make these pieces of equipment fully safety grade, of what it would cost, or of what impact in reliability, or of what the improvement in reliability would be by upgrading to fully safety grade.

JUDGE BUCK: Ms. Weiss, your voice dropped a little bit. Were you talking about a specific system now, or in general?

MS. WEISS: The point that I am now citing is

with respect to particular pieces of equipment. I think we were talking particularly about the PORV and the safety grade. Did anybody on the Staff ever make an analysis of what would be required.

JUDGE BUCK: In other words, you are talking in general now of any piece of equipment that would be classified as safety or not safety?

MS. WEISS: I think that the observation is a general one, but the point on the record at which we were discussing this was directed to particular pieces of equipment, the PORV and the pressurizer heaters.

In any case, Mr. Conran said that after the accident, these judgments were what he referred to as hot/cold decisions. Decisions had to be made very quickly on what to include in the short-term lessons of 0578 and there was little time for analysis.

But I think that it is clear that afterwards, when there was time for more analysis and more thought, the analysis has still never been done. I believe that that presented a paradigm of this case, and that virtually all of the Staff effort has been to defending its adversary position against the Union of Concerned Scientists. And, in effect, defending some hot/cold judgments without following the spirit or in even some cases, the direct word of the original Lessons Learned.

There is also in my view an enormous irony which pervades and the Staff and Licensee positions. They, and particularly GPU, claim on the one hand that what is important about the TMI accident is that the operators failed to do their job correctly. Of course, that was because the accident sequence had not been foreseen by the plant designers, whose computer programs had failed to predict it, and because reliable safety grade instrumentation had not been provided to the operators to diagnose the event properly, and because no procedures and training had been developed to deal with it.

It is claimed that TMI will not happen again because the operators will never make that mistake again. I think that it is probably correct that the operators will never make that exact mistake again. Yet, GPU resolutely resists design changes that would make the equipment the operator is trained to rely on during an accident, trained to use, equipment that he is familiar with like the heaters and the PORVs, safety grade so that that equipment can be relied on.

And it uses the argument that it need not make this equipment safety grade because if it fails, the operator can improvise with bleed and feed or cool down the plant in a solid water condition using high pressure

injection for pressure control. This stands the Lessons Learned from the TMI accident on their head. Instead of making the job easier or clearer, it will make it more difficult for the operator in the midst of an accident.

I would like to respond to some general assertions made by GPU. The first thing, the very first thing that they argued to the Appeal Board is that none of the UCS contentions is unique to TMI. Well, conceding that this doesn't, in their words, decide the matter, they claim that UCS has mounted a generic assault on regulation, and ominously raised the spectre that other plants might have to be changed if TMI is changed.

This issue was raised over and over again during the cross examination, and I think you should recognize it for what it is. It is essentially a threat: don't touch us, because you might have to touch other plants. Don't address safety problems at TMI unless it is unique to TMI. The argument has not merit. All safety issues are generic, to some extent.

This flows from the fact that there are a limited number of nuclear plant designs. Indeed, that is precisely why the Lessons Learned from the TMI accident apply throughout the industry and not just at TMI.

If you adopt the Licensee's reasoning either implicit or explicit, any applicant could argue that all they have to do is find another plant with the same safety problem and because it is not unique, it doesn't have to be addressed. You have rejected such arguments repeatedly in the North Ana decision, the River Bend decision and others, and I am confident that you won't be swayed by them now.

JUDGE EDLES: Ms. Weiss, let me ask you a question in terms of the North Ana decision and others. As I read some of those cases, there seems to be sort of two lines of precedent; one suggesting that we ought to look at matters to assure ourselves that there is likely to be a reasonably safe situation before we order the plant restarted.

On the other hand, there is a suggestion in some of the cases that if the matter is genuinely generic and is before the Commission by way of rulemaking, that those are matters on which we ought to leave our hands off. Can you help me with what appears to be two parallel and, to some degree, inconsistent lines of arguments in those cases?

MS. WEISS: Well, I think you are right. I guess I do not see a fatal inconsistency. I think that the Douglass Point line of cases, as it is being

developed, says to you that if the Commission has accepted something for rulemaking, that you ought not to duplicate the Commission's efforts.

There is really one point at which that argument is raised and which directly applies, and we have argued it, and that is with respect to environmental qualification. But with respect to the rest of these issues, the precise question the Commission put to the Licensing Board is, are these fixes based on a review to date of TMI necessary and sufficient?

So in order to do that, you are, to some extent, reviewing what the Commission laid out in its requirements, and that is precisely what the Licensing Board and Appeal Board have been told to do. So I don't necessarily see any inconsistency.

The Licensee also claims that the UCS case focuses on hardware and not on operator training and procedures, and that that is contrary to the Lessons Learned. On the contrary, the UCS position throughout was that the equipment that was actually used by an operator during an accident should be reliable so that he can believe in it and so that he can use it. And that the equipment which is necessary during modes of plant operation with which the operator is familiar

should be reliable; hence, safety grade.

We questioned very frequently on the plant procedures to determine the extent to which they relied on non-safety grade equipment or otherwise were inadequate. And time and again, Licensee's witnesses were not familiar with those plant procedures. UCS knew more about what was in those than the Licensee's witnesses, and certainly than the Staff's witnesses, and in some cases we found errors in the procedures, and we are still finding errors in the procedures vis-a-vis the letter you just got a couple of days ago from GPU.

The Licensee, on the other hand, preferred to stand on generalities. They claim that they have retrained the operators, they have redone the procedures, but on the specifics, they are the ones who fell down. Not us.

In addition, the precise plant procedures and training intended to guide the operator through events such as TMI, the accident and transient operator guidelines, have not yet been written. Much less that the operator has been trained.

Finally, we were the party that pointed out that relying on operators to cool down the plant with the reactor coolant system solid, controlling pressure by HPI, places unreasonable and unnecessary demands on

the operators; exactly what they should not be faced with in the midst of an accident. GPU's reliance on operators is contrary to the Lessons Learned, and GPU is unwilling to make the changes that would make their job doable.

Further, there is an argument raised with respect to the design basis. GPU retreats repeatedly to the position repeatedly that no changes need to be made because the accident under consideration is beyond the design basis. They claim that there is no need for the Commission to consider the possibility that core damage may occur in the future.

What, then, is the purpose of the high point vents? What is the purpose of the shielding or environmental qualification for all equipment needed in a post-LOCA core damage environment? What is the purpose of the instrumentation to detect inadequate core cooling, core water level, or volume level?

In my view, nothing could show more clearly the utter failure of this Licensee to understand that TMI-2 teaches that we cannot rely solely on the premise that serious accidents will never happen, but that we must plan for their occurence.

Finally, the claim was made that UCS had no coherent licensing strategy which it would substitute

for the NRC's. On the contrary, we think the original Lessons Learned did provide a coherent strategy, largely based on defense-in-depth principles, with the acknowledgement that previous practice, while claiming adherence to that principle, did not properly apply it. The Licensee gives one example of the incoherence, the alleged incoherence of UCS's position on page 12 of its brief. "In other words, if a piece of equipment might be called upon to mitigate an accident, then it should be made safety grade and it should not be challenged."

Well, to begin with, there is substantial distortion in that paraphrase of our testimony. What we said was that if a piece of equipment is called upon to mitigate an accident, it should be made safety grade and it should not be challenged unnecessarily or in ways that exceed its design basis.

This observation that safety equipment should not be unnecessarily challenged is hardly exceptional. It is a statement of defense-in-depth, what has been called by this Licensing Board, the regulatory cornerstone of the NRC.

I am frankly amazed that GPU would express sarcastic denigration of the principle. It is the basis for general design criterion 14, for example. If this makes a museum piece of nuclear plants, then they are

already museum pieces; they just have raw edges. I believe UCS has been coherent in its approach.

In contrast, it is incoherent to say that the PORV does not have to be safety grade, but the high point vents do, for the same purpose. That is, for the purpose of limiting breaches to the reactor coolant pressure boundary. It is incoherent to rely so heavily on new operator training and procedures and then refuse to make safety grade and hence reliable the equipment the operators are trained to rely on.

It is incoherent to rely on feed and bleed through the safety valves when the ability of the safety valves to perform that function has never been verified. It is incoherent to rely on decay heat removal on use of high pressure injection to control water in a water solid reactor coolant system when that places exceedingly high demands on an operator and has never been demonstrated under actual conditions.

It is incoherent to claim that providing a connection between non-safety heaters and emergency power supplies is a benefit to safety when a failure in the non-safety grade pressurizer heater circuits could disable the emergency power supplies.

It is incoherent to claim that this plant is safe enough to operate when the available evidence is

that general design criteria 4 with respect to environmental qualification is not met.

And finally, it is incoherent to claim that a TMI-2 accident will never happen again because the operators have been trained now, when the computer models used to predict plant behavior for the purpose of training operators cannot accurately predict plant behavior, and when the operator guidelines for TMI for multiple-failure events -- exactly what happened at TMI -- do not exist.

I would like to go, at this point, to the contentions.

JUDGE BUCK: Ms. Weiss, before you go ahead with that, there was a great deal of time spent in the hearings on the definitions of "importance to safety" and "safety grade" and so on, and I wonder how you go about looking at equipment in the plant under criterion 1. And if I may read that criterion, it says, "Quality standards and records: Structures, systems and components important to safety shall be designed, fabricated and erected and tested to quality standards commensurate with the importance of the safety functions to be performed."

Now that would imply to me that there are various levels of standards that should be applied. How

do you -- or what do you propose -- how do you look at various pieces of equipment and decide which level of safety they should be built to?

MS. WEISS: I have never seen General Design Criterion 1 cited for anything.

JUDGE BUCK: Well, I am trying to get to Design Criterion 1. You see, as I was listening to you, Ms. Weiss, you were using "safety grade" and "importance to safety" as though there was one definition. I read Criterion 1 as having several definitions or several levels, and I wonder how you would separate those.

MS. WEISS: I think that the language of GDC-1 as you have read it suggests that there are -- well, it says -- different functions and different levels. I have never seen GDC-1 used. I don't know how the Staff used it. They couldn't provide us with one example of how it is actually used in the regulation of plants. It was cited as the basis for theoretical argument, a theoretical construct, that GDC-1 introduces this concept. GDC-1 says what it says. Maybe it introduces a concept, but as a practical matter, the rest of that argument never held up.

The argument was made you go to Reg Guide 1.29, and you will find there a list of all safety grade equipment. That follows from this notion that there is

a separation of function; a separation depending on how important a function is. There are different levels of safety, and the witness said ergo, since Reg Guide 1.29 says that it contains a list of all equipment which must perform critical safety functions after an earthquake; therefore, that must contain a list of all safety-grade equipment within his definition, and there should be nothing in that list that is not safety grade.

JUDGE BUCK: Did the witness claim it was an all-inclusive list?

MS. WEISS: Yes, and that it was exclusive. It contained a list of all safety-grade equipment, and only all safety grade.

JUDGE BUCK: Were these --

MS. WEISS: In fact, they were. The PORV is listed in Reg Guide 1.29. The cooling water systems for the condenser condensate system was listed.

JUDGE BUCK: I am asking you, do you agree that there are pieces of equipment that have a greater function or a greater purpose as far as safety is concerned than other pieces?

MS. WEISS: I think there are pieces of equipment that serve a different function because they have a different design basis, or they are required to function at different times to mitigate different

accidents.

I don't know where one finds support in application of the rules that equipment important to safety is not synonomous with safety grade.

JUDGE BUCK: I have here in the regulations -- I am not talking about Staff guidelines or anything --

MS. WEISS: You have some words which have never been applied, to my knowledge, to create a meaningful distinction between safety grade equipment and equipment important to safety.

JUDGE BUCK: And you are saying, then, that if any system has some relationship to safety, it has to be top quality?

MS. WEISS: If it is important to safety.

JUDGE BUCK: But everything would have to be the same quality.

MS. WEISS: Everything would have to meet the quality assurance regs, for sure.

JUDGE BUCK: For that level of safety.

MS. WEISS: Sure.

JUDGE BUCK: What I am asking you -- where do you separate these? I am asking you to tell me where you would separate these things.

MS. WEISS: I think one needs to approach it not in the abstract, but with respect to the particular

pieces of equipment that we have talked about.

JUDGE BUCK: Okay, what is your top safety?

MS. WEISS: I think the PORV.

JUDGE BUCK: The top safety system, let's put it that way.

MS. WEISS: I don't accept that there is any breakdown of safety systems on the basis of which is the most important. I think it is important to safety. I am not saying it's at the top of list because I don't concede that some list or some priority ranking exists.

I say it is important to safety. It is important to safety because it protects the pressure vessel during low temperature operation. It is important to safety because it does the bleeding function. It is in the procedures to perform the bleeding function during bleed and feed. It is important to safety because it is part of the reactor coolant boundary, and inadvertent actuation of it causes a breach of the reactor coolant pressure boundary.

We have given four other reasons. In my view, in the cumulative, that is important to safety. That requires the exercise of some judgment, no question about it. But we say that we are correct in that.

JUDGE BUCK: That is your definition and how you apply it to various pieces. Thank you.

JUDGE EDLES: Would that entail a sort of rewriting through interpretation of the Commission's distinctions within the regulation, so as to -- in essence, I think what you are saying is that everything is really important to safety.

MS. WEISS: No, I don't think it requires any rewrite of the Commission's rules. I think that Judge Gotchy and Judge Buck know that the Commission always uses the important to safety, safety related and safety grade interchangeably. I think you know that. We have given you language in the Commission that indicates it, language from the general design criteria, language from 0578 that indicates it and testimony of somebody who worked 7 years for the NRC or Atomic Energy Commission that says it. If it is important to safety it should be safety grade. Those terms have always been used interchangeably.

That is not to suggest that there is not an exercise of judgment involved in determining whether it is important to safety. And in each example we tried to give you the facts that suggest you should exercise the judgment in favor of the finding that it is important to safety.

But what is not in the rules and what is not in the NRC's practice is the proposition that if there

is any other way of achieving a safety function, any other way of achieving the safety function, then the piece of equipment doesn't have to be safety grade. Otherwise, why is an emergency feedwater safety grade?

JUDGE BUCK: I was surprised during the course of this hearing in reading the record that somewhere along the course of this hearing there was a letter sent out by I think it was Mr. Denton in which he gave some definitions for "important to safety" and "safety" and which turned out to be exactly the definitions given in the introduction to the generl criteria. And these were issued as the definitions that the Staff was to use.

What were they using before that, do you know?

MS. WEISS: Well, Jensen was the witness who appeared on relevant pertinent issues before. Conran up here and Jensen used the terms interchangeably, safety grade and important to safety. It isn't a question of how does one define safety grade. And the definition that safety grade only applies to critical safety functions never appeared before Mr. Conran showed up. After he showed up, the Staff sent around a notice to everybody to use his definitions. I don't think it is any coincidence that they were directed to conform their evidence to that.

We have briefed in some detail the issue of

the qualifications of Mr. Conran. He was really the only witness that we did an extensive voir dire on. It is not usually a profitable enterprise to voir dire the Staff witnesses because they tend to get qualified. We did it because we thought there were serious questions about his qualifications to give the testimony that he gave.

I hope that you will read that and I hope that you will keep in mind that the man was assigned to write this testimony two weeks before it was handed in, and that was essentially his first real relationship to this issue in the case. And I don't think that he was qualified to give it. I think that he was a post-litigation construct to fit a conclusion which the Staff wished to reach. I don't think it confirms with prior practice, and I don't think it makes particular sense.

I want to talk to you about bleed and feed because it turns out to be terribly important to this decision. It is used in part to resolve UCS contentions 1 and 2, 3 and 5 for that matter. I think there has been an awful lot of obfuscation. I want to postulate a scenario which we think the evidence supports. I know you will ask me some questions about it. The others apparently have different views, but here goes.

If there is no feedwater it is undisputed that bleed and feed is needed to remove decay heat, and it is not so farfetched to postulate a loss of aux feedwater. Neither main feedwater or emergency feedwater are safety grade at restart, and even after emergency feedwater is made safty grade, the Board has still found that there will be a high failure rate.

It is not true that emergency feedwater initiation is safety grade. The pumps, -- the automatic initiation of the emergency feedwater pumps is safety grade. The flow valves are opened and controlled by the non-safety grade ICS. The Licensee claims that it is an exceedingly remote scenario for loss of all feedwater. I don't think the record supports that at all.

Moreover, it is not required to postulate an event beyond the design basis. Neither emergency feedwater nor main feedwater is safety grade. The proper application of the single failure criteria requires you to postulate that both are lost. If you have feedwater, there is a range of small break LOCAs where steam voiding will interrupt natural circulation. That, too, is not disputed.

The procedures call for refilling the primary system, and I might interject at this point that it is not particularly relevant that there is a high entry

point because the procedures call for refilling the primary system all the way up. It is going to be above the tube sheet, and there will be no condensing surface for the boiler condenser.

For some of these break sizes, HPI flow will exceed the break flow. Reactor coolant pressure will continue to rise until it reaches the set point of the PORV, or the pressurizer safety valves, and then you are in bleed and feed. That does not require postulating anything beyond the design basis. And, of course, if there is core damage and blockage with non-condensible gases, they must be removed through the vents, a scenario that is similar.

So it is not correct that one enters bleed and feed only for beyond design basis events. The fact is that bleed and feed was crucial to this case. The Staff never performed an analysis of the capability or reliability of bleed and feed cooling for TMI-1. There have been no tests of bleed and feed. All the tests referred to by the Staff were of liquid natural circulation.

None of the so-called unplanned occurrences actually simulated bleed and feed. The combination of actions the operator must take during a LOCA and the decision process to be followed is a complex one. And

there is a great deal on the record about that, particularly at transcript 4788 to 4840. And that introduces another element of unreliability.

The Licensee proposes to rely on the pressurizer safety valves to perform the bleed and feed function -- the bleeding function, excuse me, since the PORV is not safety grade. But the pressurizer safety valves have never been verified to be capable of performing the numerous openings and closings under liquid two-phase and steam conditions that might be called for during bleed and feed. If pressurizer safety valves fail, there is no block valve. Finally, the pressurizer safety valves cannot be used to depressurize the plant to go to residual heat removal to cold shutdown.

I would like at this point to leave -- if you all have some questions on that, on 1 and 2 or 3 --

JUDGE BUCK: Well, there are a lot of questions on the scenario, as I think you probably realize. You have to postulate, for example, in the EFW, that the operator fails to bypass the ICS. Is that correct? In order to get this loss of emergency feedwater?

MS. WEISS: No. I think, Dr. Buck, -- and I will ask Mr. Pollard to interrupt me if I am wrong --

that a failure in the ICS circuitry may cause the valves either to open or to close.

JUDGE BUCK: But the operator, as I recall the present setup, can bypass that ICS from the control board?

MS. WEISS: Can you respond to that, Bob?

MR. POLLARD: That is correct.

JUDGE BUCK: Is that correct?

MR. POLLARD: That is correct. It is correct that the plant has provisions for the operator to control emergency feedwater separate from the ICS.

JUDGE BUCK: Right, okay. So you are postulating, then, that there is an operator failure as well as an ICS failure in your scenario, to have all of the water blocked out?

MS. WEISS: Would you mind of Mr. Pollard answered?

JUDGE BUCK: Not at all.

JUDGE EDLES: Not at all. Let him come forward.

MS. WEISS: I just don't want to get myself --

JUDGE EDLES: You might also identify yourself for the record.

MR. POLLARD: Yes. I am Robert D. Pollard, Nuclear Safety Engineer on the staff of the Union of

Concerned Scientists. It depends -- whether you say you need to postulate operator failure I suppose depends upon what you consider to be a system which meets the criteria for safety grade systems.

JUDGE BUCK: Well, Mr. Pollard, just one moment. Ms. Weiss postulated a scenario. The scenario called for the loss of the main feedwater and the emergency feedwater. Now I am going to the causes of the loss of main feedwater and emergency feedwater. She pointed out that the ICS was not safety grade and, therefore, might fail.

Now I am asking -- then, you also have to postulate in order to lose the emergency feedwater, a failure of the operator to bypass the ICS. Is that correct?

MR. POLLARD: That is correct, but I do not consider that a contradiction to the statement that the emergency feedwater system is not safety grade; therefore --

JUDGE BUCK: I am not talking about that for the moment. All I am talking about is what the scenario has to go through in order to get the full loss of water.

MR. POLLARD: You have to assume the operators do not bypass the ICS in sufficient time to restore emergency feedwater. But I would also like to add that,

as Mr. Weiss said, that even if emergency feedwater is available, you still wind up in the situation, for the majority of small break LOCAs smaller than .01 square feet, where the steam binding itself is sufficient to interrupt --

JUDGE BUCK: I don't think you postulated that in the scenario. That is a second scenario. The one she postulated was a total loss of feedwater, and I am just trying to find out what one has to postulate in order to get that total loss.

One was the fact that the operator fails to bypass the ICS. That is what I was after, the total scenario, what it involves.

MR. POLLARD: That is correct, but the point she started addressing was that it is not correct to say that the emergency feedwater system is safety grade at restart.

JUDGE BUCK: I wasn't talking about that; I was talking about her scenario.

MS. WEISS: The second part of my scenario did postulate that feedwater is available. There is a range of small break LOCAs where steam voiding will interrupt natural circulation. For this whole scenario, feedwater can be available. The procedures call for refilling the primary system, removing the condensing surface. For

some of these breaks, HPI flow will exceed the break flow. The system will continue to pressurize until it reaches the setpoint of the PORV or the safety valves, and then you are into bleed and feed.

JUDGE BUCK: And then you are in feed and bleed.

MS. WEISS: Whether you have feedwater or you don't.

JUDGE BUCK: It also postulates that your HPI is not capable of being throttled?

MS. WEISS: It postulates that the operator follows the procedures, and the TMI procedures call for him --

JUDGE BUCK: Is he forbidden to throttle the HPI?

MS. WEISS: The TMI procedures call for him to keep HPI on full until specified conditions of subcooling are met, and they would not be under this scenario.

JUDGE BUCK: So under your scenario you go into feed and bleed?

MS. WEISS: Yes.

JUDGE BUCK: Okay, go ahead.

MS. WEISS: I really had prepared no further remarks on 1 and 2. So this is the appropriate time, if

the Board has any questions. Otherwise, my plan was to go on to contention 5.

JUDGE BUCK: Why don't you go ahead. We may come back to that, but why don't you go ahead.

MS. WEISS: Contention 5 deals with the PORV. I believe that we made a clear case that the PORV -- that it is necessary for that piece of equipment to be realiable because of the many functions which it provides. It is part of the reactor coolant boundary, and its function is to prevent a LOCA.

It is required to prevent over-pressurization of the vessel at low temperatures, an exceedingly important safety function given that loss of pressure vessel integrity is not a design basis event. It is the valves which the procedures rely upon and the operators are told to use during feed and bleed.

I point out that during the steam generator tube break, you cannot rely on the safety valves. The plant will reach the setpoint at the steam generator safety valves before it ever gets to the pressurizer safety valves. It will be discharging directly into the atmosphere.

If the high point vents are safety grade both to relieve steam and gas and to prevent inadvertent actuation and thus, reach the pressure boundary, so

should the PORV. The Staff said for the vents, since they form part of the reactor coolant pressure boundary, they shall be safety grade and they shall satisfy the single-failure criterion and the requirements of IEEE 2.79 in order to ensure a low probability of inadvertent actuation. And precisely that same reasoning applies to the PORV.

Are there any questions on that?

JUDGE BUCK: Well, just one. The PORV is backed up by a block valve? Is that correct?

MS. WEISS: That's right, a non safety grade block valve.

JUDGE BUCK: I had the impression from the record that it was a safety grade block valve.

MS. WEISS: No, sir.

JUDGE BUCK: What gives you the impression that it isn't?

MS. WEISS: I think the record is clear that the block valve is not.

JUDGE BUCK: Can you refer me as to where it is not safety grade?

MS. WEISS: I will see if we can find that.

JUDGE EDLES: If you can't do it now, perhaps you can do it back on rebuttal.

MS. WEISS: Okay. I think you might also be

interested in hearing a rebuttal to the argument that is made that the two valves in series amount to a safety grade system, because that argument has been made by GPU I believe and the Staff.

JUDGE BUCK: I would be interested to hear why you think it isn't.

MS. WEISS: I am going to have to call Mr. Pollard up again. I am sorry for this shuffling back and forth, but he really is best able to address the question of why it is not correct to say that the combination of the PORV and the block valve is the same as the safety grade system as those two valves in series.

JUDGE BUCK: Well, go ahead.

MR. POLLARD: I assume that Mrs. Weiss stated the question correctly, because I honestly was looking up the answer to the last question.

JUDGE BUCK: I thought she was saying that the fact that you have the safety vents -- the two safety vents was called a safety grade system. She didn't believe that it was safety grade.

MS. WEISS: No, I was attempting to respond to the argument that the combination of the PORV and its block valve represents the equivalent of a safety grade system.

JUDGE BUCK: All right.

MS. WEISS: We acknowledge that the pressurizer safety valve is a safety grade component.

JUDGE BUCK: All right. I thought you were talking about the pressurized safety valve being in series did not form a safety grade system.

MS. WEISS: No. The pressurizer safety valve is a safety grade component. That is a far different question than whether it is qualified for feed and bleed.

JUDGE BUCK: I misunderstood. Go ahead, Mr. Pollard.

MS. WEISS: Would you address that question?

MR. POLLARD: I am sorry, Dr. Buck, at this point I don't know what the question is that I am supposed to answer.

(Laughter.)

MS. WEISS: Let me state it. The question is: Why is it not accurate to claim that the combination of the PORV and its block valve is the equivalent of a safety grade system for performing the functions of the PORV.

MR. POLLARD: The combination of two non-safety grade components or, for that matter, a multitude of non-safety grade components, does not add up to a single safety-grade system. The PORV itself is subject to a single failure that could cause its

inadvertent opening. There is a conflict apparently on the record as to whether or not the block valve is environmentally qualified.

I think there should be no conflict that all of the equipment needed to operate the block valve is environmentally qualified, since I think there is no testimony on the record with respect to the routing of the circuits to the block valve, the environmental qualifications of those circuits. I believe the Licensee at one point alleged that the operator on the block valve had itself been environmentally qualified.

I don't know -- other than that statement, I don't believe that was the case.

JUDGE BUCK: Well, there have been some flat statements that the block valve is safety grade equipment and I think we will have to get this straightened out. Perhaps the Licensee can help us out when they get up here.

MR. POLLARD: If the block valve were safety grade -- let's use that as an assumption -- you then still do not have a single-failure proof system. That is, a failure of the PORV must be postulated because it is non-safety, and then a single failure of the presumably safety-grade block valve does not give you a system that prevents inadvertent actuation by a single

failure, or inadvertent breach of the reactor coolant system.

JUDGE BUCK: That is essentially the same as the two vent valves in series, is it not?

MR. POLLARD: No, sir, because if you postulate the failure of one vent valve, that is the single failure because it is safety grade. Therefore, you may not postulate the failure of the second safety grade valve on the vent system. That is the distinction.

JUDGE BUCK: Thank you.

MS. WEISS: I will try to find out the answer for you on the block valve for rebuttal.

If there are not any further questions on the PORV, my plan was to go on to the question of the pressurizer heaters.

JUDGE BUCK: I do not think I have any more, Ms. Weiss. Go ahead. As I said, I am reserving my right to come back to it if I think of something.

MS. WEISS: I wish you would because I am running out of stuff to say.

(Laughter.)

JUDGE BUCK: We will have some questions, don't worry.

MS. WEISS: I think that Contentions 3 and 4 need to be considered together. They go to the issue of the pressurizer heaters and whether those ought to be made safety-grade so that they can be relied upon to control pressure during natural circulation. That is Contention 3.

Contention 4 is that if the plan of the Applicant is followed through and the provision is made to connect the heaters, the nonsafety heaters, to emergency powers supplies as presently proposed, a fault in the pressurizer heater circuits could cause loss of the emergency power supply.

It makes no sense to us to claim that it represents a benefit to safety to connect

nonsafety-grade heaters to the safety-grade vital emergency power buses.

Those objectives of the Lessons Learned would be met if the appropriate number of heaters were made safety-grade; that is, the heaters would then be available when needed for natural circulation, you would not need to worry about going water-solid or controlling by high-pressure injection, and at the same time when you hook them up to the emergency power supplies, you could have confidence that you were not endangering the emergency power supplies.

I believe there is no question that the TMI accident showed the importance of highly reliable decay heat removal. There really can be no serious dispute about that. The pressure in the reactor coolant system must be controlled during natural circulation, and the pressurizer heaters are normally used to perform this function. I intended to --

JUDGE BUCK: Are you going to some other subject?

MS. WEISS: No. But go ahead, please.

JUDGE BUCK: On the heaters, we asked on the record on the heaters, and the reply we got from them indicated the failures in the circuitry to the heaters but nothing I could detect in their reply that showed a

loss of heaters themselves.

Do you have any indication or any knowledge at all of heaters that have gone out to any plant?

MS. WEISS: I know it happened during that accident, that during the TMI-2 accident the breakers kept -- oh, you are trying to make a distinction between the failure in the circuitry and the failure in the heaters themselves?

JUDGE BUCK: Absolutely.

MS. WEISS: I really do not know.

JUDGE BUCK: The reason I am asking that is that the circuitry in the heaters now has been improved and supposedly is safety-grade circuitry. Now, my question is -- the question is -- and they are also, as I understand the record as I have read it now, that the operators are given strict instructions as to when they reconnect the heater after a short-out.

Now, my question really is: if we have no record of the heaters themselves going out and if the record has always been in the circuitry, has not this been improved to the point they have not only improved the wiring, they have improved the circuit breaker system and that sort of thing to the heaters?

MS. WEISS: You are talking about the interface, are you not?

JUDGE BUCK: I am talking about the total wiring connections from the heater into, shall we say, the diesel bus, including the relay circuits and the high-current low-voltage breakers and all that sort of thing.

MS. WEISS: My understanding, Dr. Buck, is that the circuitry has not been made safety-grade. And I think it would be great news to me if you could show me a place in the record that would indicate that the circuitry for the heaters is environmentally qualified, is seismically qualified.

JUDGE BUCK: I am talking about the heaters themselves at the moment.

MS. WEISS: The circuitry.

JUDGE BUCK: I am not talking about the connections.

MS. WEISS: The cables, the instrumentation, the circuitry is environmentally qualified or independent, or diverse, or separated, or seismically qualified.

JUDGE BUCK: We have got a problem about the environmental qualifications in this hearing.

MS. WEISS: You sure can't --

JUDGE BUCK: As far as the Appeal Panel is concerned.

MS. WEISS: Or physically separated. I think the record is clear that the circuitry is not safety-grade. The argument the Licensees made was that the interface between the nonsafety-grade heaters and its circuitry and the safety-grade emergency power supplies, they claimed that that was safety-grade.

Now on this point even the Board agreed with UCS that Regulatory Guide 1.75 was not met. Now, in my view, Regulatory Guide 1.75 defines a safety-grade interface. They do not have it. Even the Board agreed with us that they do not have an interface that complies with Reg Guide 1.75. They are relying on a system of breakers. They are relying on precisely the same reasoning that was rejected in Reg Guide 1.75. One cannot rely on breakers in sequence because a fault can be felt simultaneously along the whole line.

JUDGE BUCK: So it is your position that is not safety-grade?

MS. WEISS: Oh, absolutely.

JUDGE BUCK: Okay. Thank you.

MS. WEISS: Well, I was going to read the portion, but I am sure you have all read it, of 0578 that is quoted in our contention with respect to the purpose of providing a connection between the heaters and the emergency power supplies. It is a two-fold

purpose: first, to increase the availability of the heaters for natural circulation; and second, to decrease challenges to the emergency core cooling system which occur if the heaters fail.

As I said, heaters and their instrumentation and controls are not safety-grade, they are not seismically or environmentally qualified, they are not diverse, they are not separated, they are not independent, they are not single-failure-proof. And I want to remind --

JUDGE BUCK: What do you mean by "not independent"?

MS. WEISS: Well, I should have said they are not separated. I guess independence is really not the right word to use in this context. So far as we know, they are not physically separated.

JUDGE BUCK: The heaters themselves?

MS. WEISS: The cables are not physically separated. The Board said that the heaters do not need to be safety-grade because pressure control -- pressure can be controlled using other means. At this point we come full circle because the other means are feed-and-bleed, number one, and number two, natural circulation with the water-solid reactor coolant system, pressure controlled by the high-pressure injection

system. It does not get any better the more you rely on it or the more you rely on those.

We have already addressed feed-and-bleed.

As to water-solid operation, I frankly find the Board's order to be inexplicable. They are going to rely on operators to perform an extremely tricky maneuver that has never been done all the way to cold shutdown in an operating plant that requires the full time and attention of at least one operator, and you are going to allow that on the basis of one control test.

The Licensee claims in this connection that UCS would never be satisfied, that we quibble with the test. We point out to this Board that it would be one thing if the question at issue was the capability of the equipment. Then this test would tell you what you need to know or at least a good portion of what you need to know.

But that is not the question. The question is the wisdom of relying on the operator in the midst of an accident to perform this maneuver. It is not tested by this test, and there has been no rebuttal to our evidence about how difficult this maneuver is to accomplish.

The Licensee cites testimony by its witnesses claiming that there is 16 minutes before plant pressure

would go from normal to the safety valve set-point. That is on page 33 of its brief. It is very deceptive. The particular question which is referenced therein went to the effect of adding water to the system in a solid condition. The very next question was the effect of temperature change, what is the effect of temperature change on pressure in a water-solid system, a 1 percent change in average RCS temperature.

MR. POLLARD: 1 degree.

MS. WEISS: 1 degree. Excuse me. 1 degree change in average RCS temperature results in an 87 p.s.i. change at 550 degrees. That is hardly ample time for operator action, and that piece of news is conveniently left out.

GPU claims that there is no need to worry about the failure of the heaters because there is plenty of time to restore power. The point is made over and over again, don't worry, we can restore power. What is overlooked here and consistently throughout the Licensee's case on Contentions 3 and 4 is that of interest is not only the failure of power to the heaters, the failure of interest is the failure in the nonsafety-grade heater circuits. The heaters fail during the accidents.

The breakers kept tripping not because of loss

of power, but, we understand, because of exposure to high humidity.

JUDGE BUCK: I am sorry, I did not hear that.

MS. WEISS: Exposure to high humidity. Lack of environmental qualification.

JUDGE BUCK: This is the wiring that failed, as I recall.

MS. WEISS: Yes. And as far as we know, there is nothing on this record to suggest that that has been remedied. The fact is it is not single-failure, it is not safety-grade, it is not environmentally qualified.

Contention 4 with respect to the connection of the nonsafety heaters to the emergency buses, I went over this a little bit before. Even the Board found that Reg Guide 1.75 defined a safety-grade interface, which in our view defines a safety-grade interface, was not met. The consequence is not just that you have not met a regulatory guide. That regulatory guide constitutes a way of meeting General Design Criterion 17. General Design Criterion 17 is a rule. It is not waivable, and there is nothing on this record that indicates that it has been met in the absence of compliance with Reg Guide 1.75.

The Board, in our view, has cited in one big paragraph cited a series of what it calls "competing

interests of counter arguments." They are either not relevant or, in what I suspect is a very candid moment, they suggest that because the Commission included as a short-term fix in 0578 the connection of the heaters, provision of connection of the heaters to the emergency power supplies, that that somehow represents a competing interest, an interest that competes against UCS's contention.

For one thing, the Licensing Board was there to judge the sufficiency of these measures, and certainly not to give any presumption in favor of a measure simply because it was on the list.

Secondly, and what discourages me the most about that finding is that it completely overlooks the fact that the objective which the Commission had in mind when it called for the connection of the heaters to the emergency power supplies would be fully met without endangering the power supplies by simply either making the system safety-grade or simply making the interface safety-grade.

The record is clear that there are devices, safety-grade devices, for meeting Reg Guide 1.75 which are available.

I have, by my reckoning, about 5 minutes left. I think I would like to use it to talk a little

bit about environmental qualifications because Dr. Buck raised the issue, and I imagine the Board is thinking about it.

JUDGE EDLES: By my reckoning, you have 15 minutes left, and you are welcome to take as much of that time as you like.

MS. WEISS: Thank you. I would like to talk a little bit about CLI 80.21 both in connection with GPU's objection to your Question III.E, which inquired about the status of environmental qualification, and with respect to the argument that is made on the merits that the Commission has determined this issue and which is essentially what the Board adopted.

I am familiar with CLI 80.21 because I represented the party that brought it, and there are, in my view, four important things that that decision says. First, it says the old standards for judging compliance with General Design Criterion 4 are not adequate, and that includes the standards at the time TMI was licensed. The standards are not adqeuate for determining environmental qualification of safety-grade equipment.

Number two, it is necessary, therefore, to backfit new requirements to all operating plants. All operating plants must demonstrate that they comply with

the new requirements by July 1982.

Three, the Commission said at page 17 of 11 NRC, these deadlines do not excuse Licensees from the obligaion to promptly replace or modify inadequate equipment.

Number four, directly below that statement, the Commission said the Staff will at any points during its review be faced with situations where documentation is poor or where the documentation shows that equipment is not qualified -- either of those options. It does not have to prove this equipment is not innocent until proven guilty.

JUDGE EDLES: Counsel, let me ask you this. In the June 30 notice that the Commission put out, it indicates that the Commission has received and the Staff has evaluated each operating plant licensee's justification for continued operation. Was the TMI plant among those received by the Staff and considered, presumably --

MS. WEISS: I presume that it is. I am not sure we have checked that. What I think the Commission said is that the Staff received the justifications. It says everything is okay. We did not review it.

JUDGE EDLES: Let me assume that the Commission did not indeed review it for the purposes of

our argument but simply saet forth in its notice, and I am quoting, "The Commission has determined that continued opeation of these plants pending completion of the equipment qualification program will not present undue risk to the public health and safety."

To what degree am I permitted to second-guess that determination, even assuming there is no basis behind it, as you are suggesting?

MS. WEISS: Let me answer that question two ways.

JUDGE EDLES: I appreciate that it may be an uncomfortable position for me, but help me out.

MS. WEISS: Okay. Let me say, first of all, that you are presumably, if you are following the Commission's strictures, only prohibited from undoing what they have done.

All that they have done is lift a deadline, and they have lifted that deadline on the basis that that general deadline could be lifted, that there was nothing prohibiting lifting the general deadline. That is the only thing that has been touched is the June or July 1982 deadline. They have not changed the statement, nor could they, given General Design Criterion 4 that these deadlines do not excuse the Licensee from the obligation to promptly replace

inadequate equipment.

JUDGE EDLES: I understand that. How prompt is prompt?

MS. WEISS: Well, obviously, if the setting of the deadline does not by itself excuse the Licensee, one has at least to read that in combination with the next sentence which says that you are going to come to many points during this review when either qualification is poor or it shows lack of qualification.

JUDGE BUCK: Yes. But they have said the equipment is satisfactory as far as the public health and safety until that deadline.

MS. WEISS: No. How can one say that given the sentence that says deadlines do not excuse, the deadlines do not excuse the Licensee from obligation to promptly replace equipment? And they could not do it. I suggest to you they have not waived compliance with General Design Criterion 4. And they cannot.

Now, there is an interesting piece of the findings of the proposed findings of the Staff, and I had the page, it is their proposed findings on Contention 12, and I think it is paragraph 21. I just read it last night.

And what it proposes that the Board adopt as a finding is that the Board has two choices: it can

either ask the Commission to waive compliance with GDC-4 or it can offer as license conditions that this plant not be permitted to start up to go above 5 percent power until it has met the conditions that the Staff says are necessary.

Now, of course, we argue with whether they have properly outlined the scope of the issue, but nonetheless, I think what is significant for you to focus on is that the Staff recognized that the obligation to meet General Design Criterion 4 is a continuing one and it has been not been waived by the Commission. I think that is absolutely true.

I also wanted to say that this is reminiscent to me of the argument that was made on the Vermont Yankee case. Dr. Buck I am sure remembers it.

JUDGE BUCK: All twoo well.

MS. WEISS: And it is still around.

Intervenors claimed that the Commission had to consider the environmental impact before it licensed the plant. To make it short, in the -- excuse me, this is the Minnesota case, this is not the Vermont Yankee case. Let me backtrack a little bit.

The question was on spent fuel expansion, can the Commission permit spent fuel expansion without considering the long-term impact of that waste on site?

And there wer stipulations of fact in the case to the effect that there were no plans and no means to get rid of that. Well, there was intention to get rid of it, but no way to get that waste off the site.

The appeal board resolved that case by reaching down -- and, of course, they were advised to do this by the Staff and the Applicant -- reaching up and grabbing some Commission's words which had been used in denying the rulemaking petition.

The Commission issued words in the denial of this rulemaking petition to the effect that we have confidence that the waste situation will be solved, so there is no need to worry about that.

The Appeal Board said, well, the Commission has resolved this issue, the Commission has resolved this issue, so we cannot look at it, even though if we looked at the facts we might have a hard time resolving it.

It went up to the Court of Appeals, and I argued to the Court of Appeals that the Commission cannot resolve an issue that has been legitimately raised that is within the jurisdiction of the agency to decide by fiat. The Commission cannot do it by fiat. And the Court agreed with us there. And I think that that is very analogous.

JUDGE EDLES: But did that go to the respective relationship between the Commission and the Appeal Board as to what the Commission could or could not do in reaching its ultimate decision?

MS. WEISS: It went to what the Commission could do, and I think it is certainly open for the Appeal Board to refuse to use the Commission's action in the way it has been suggested on the simple grounds that to do so would be unlawful and, therefore, the Commission could not have so required or could not have so suggested that the Appeal Board ought to use it.

JUDGE EDLES: I am suggesting only whether or not we have been effectively divested of our jurisdiction, not whether the Commission in due course must reach a determination.

MS. WEISS: I think that you need to infer a fair amount to infer that. Given the fact the Commission has been sitting on top of this case, to say the least, reading all these pleadings and that there are, oh, lots of Commission staff out there in the audience, I think that they would have told you by now if they intended to divest you of jurisdiction to decide that. They did not hesitate to tell you that in the steam generator case.

(Board conferring.)

MS. WEISS: I am reminded it is a good thing to remind you that CLI 80.21, neither CLI 80.21 nor the environmental qualifications rule which flowed from that decision deal with the issues raised, the environmental qualification issues raised by TMI and the Lessons Learned. In fact, the rule explicitly states that it does not consider the Lessons Learned from TMI-2. So I think that is also relevant for you to consider.

I think that on environmental qualification you ought to understand exactly what happened, exactly what the Staff did. They stonewalled this. They came to the Board with evidence only on 1 percent fuel failure, objected to the Safety Evaluation Report which we offered which shows the status of environmental qualification on grounds that it considered that the SER considered conditions beyond 1 percent fuel failure. And then when they were told by the Board that the scope of this contention went at least as far as the TMI-2 scenario, substantially more than 1 percent fuel failure, they essentially blackmailed the Board. That is a strong word, but I think it is right.

They said, if you require us to come in here with evidence considering the ability of TMI safety equipment to survive a TMI-2 accident, it is going to take us a very long time and this hearing will be held

up a very long time. And I think there is no question but that the Board backed down.

I think it is a bizarre result that they should have rejected the SER because the Staff forced them to reject the SER. They should allow the Staff by its own intransigence to consider an accident far below the consequences of TMI-1 and then for the Board to say that we are going to resolve this, resolve this impasse and void in the record by directing the Staff to report to the Commission that the issue has been satisfactorily resolved, I think it violates every premise of administrative due process for the Staff to be given the authority after we tried to ligitate this issue and were unable to do so.

For the Staff to certify to the Commission that everything is all right is absolutely preposterous.

Gentlemen, I really am through with my prepared remarks, and I am available to take any questions you have.

JUDGE BUCK: I would like to ask a couple, Ms. Weiss. These are clarifications more than anything else.

In answer to our Question III.A on the March -- or the July 24th order, I think it was, we said in paragraph 6, I can read it to you, 628 of the PID, the Licensing Board discussed the installation of shield

walls in the motor control centers. What is the status of the Staff review, and what is the source term?

I gather from your remarks in answer to that that you are concerned that the design of that shield wall itself is not being reviewed by the Staff or being left to the I&E inspectors to look at the wall and see whether it was built?

MS. WEISS: The way we read that, and those words are usually carefully chosen, we are suggesting to you that in the absence of any other interpretation of what those words mean -- and maybe the Staff will tell us we are wrong -- what it seems to say is that the inspectors will verify that the wall has been built according to the plans and outlines but that nobody is going to verify whether the design is adequate.

JUDGE BUCK: Okay. I was a little confused.

MS. WEISS: Yes.

JUDGE BUCK: Excuse me just a moment. Let me glance at some of these. Yes. On 3B there was a question of reconnecting of the pressurizer heaters and, I guess, for that matter, anything else until stabilization had occurred.

I am a little confused as to how far you are proposing to go in stabilization, whether it is stabilization of the electrical circuits, the

stabilization of the entire event, all the systems in the plant or what. There seems to be some confusion here as to what the word "stabilization" means. And I would like to know what it is you are proposing.

MS. WEISS: Well, I guess what we are saying is you should note that the Licensee proposes to attach these heaters as soon as the circuits stabilize, which the accident can still be going on, probably will be. You have no knowledge of what is connected to that diesel, whether it is needed at that moment and what would be the effects of losing the steam generators at that point. So we are just pointing out how the Licensee defines "stabilization" and what would be the effect of reconnecting the heaters after the plant has been stabilized, using that definition of stabilization.

I guess you know your larger question of when would we say that they could be reconnected, remembering that it is perfectly fine to connect them if either the interface is safety-grade or the whole system is safety-grade.

Remember, the whole problem goes away if you do that. It seems to me that if you do not do that, that you should not connect those heaters so long as the equipment being powered by the emergency power supplies is is necessary to mitigate whatever it is that is

happening in the plant. You should not, you should not connect them. You should not endanger the emergency power supplies when they are needed.

JUDGE BUCK: So you are saying you have to stabilize at least the event. Mr. Pollard is shaking his head.

MS. WEISS: Did you want to add something?

MR. POLLARD: I was just going to reiterate what Ms. Weiss said. What we are saying is as long as the heaters are nonsafety-grade, the question of how you define "stabilization" is irrelevant because once you connect the nonsafety-grade heaters to the power supply with the nonsafety-grade interface between the heaters and the power supply, you are now in jeopardy of losing your emergency power supplies. And therefore, the heaters should not be reconnected until you have no further use of the emergency power supplies. That is why we said in our comment this question of stabilization is largely irrelevant to the safety issues we raised. If the heaters were fully safety-grade and their circuitry, or if there were a safety-grade interface between the heaters and the power supplies --

JUDGE BUCK: Or? Or if they were not faulted, if they were proven to be not at fault as far as the system were concerned? Suppose something else --

MR. POLLARD: The problem with this answer is you presume after the reconnection of the heaters to the power supply you are not going to have any further failure.

JUDGE EDLES: Let us assume that something failed after they were reconnected. How would that jeopardize the power supply if we assumed that the operators have correctly determined that an overload on the heaters would not be sufficient to cause a problem?

MR. POLLARD: If they were tripped out for some other reason than fault and he then determined that there was no fault and he reconnected the heaters, if a fault at that point occurs in the heater, you stand in jeopardy of losing the power supply to which they are then connected.

JUDGE BUCK: That applies to any time you are connected to the heaters. If the fault occurs as you are connecting it --

MR. POLLARD: Not if you have a safety-grade interface which precludes the fault current from affecting the upstream safety-grade power supply. That is precisely the reasoning in Reg Guide 1.75, that when you have nonsafety-grade heater circuits connected to a safety-grade power supply in a way that does not meet the requirements of Reg Guide 1.75, a fault in the

nonsafety-grade heater circuits can jeopardize the safety power supply; whereas if you had the safety-grade interface, the fault in the heaters would only result in loss of the heaters and would not jeopardize the power supply.

JUDGE BUCK: That applies to anything in the plant with too high a load.

MR. POLLARD: It applies to anything in the plant that either meets Reg Guide 1.75 or does not meet Reg Guide 1.75.

MS. WEISS: There is no precedent, though, Dr. Buck, for requiring the reconnection, requiring the provision for reconnection of a piece of nonsafety-grade equipment to the emergency buses after the nonsafety loads have been shed. There is no precedent for that.

JUDGE BUCK: Is this a requirement?

MS. WEISS: This is a requirement of the Lessons Learned, that the provision must be there. Now, you remind me --

JUDGE BUCK: The provision must be there, yes.

MS. WEISS: The Licensee says, oh, well, we won't connect it if there is a problem. First of all, they can only tell if there is a problem with respect to capacity. We will not connect it if there is not enough capacity. They cannot tell before they connect it if

there is going to be a failure in the circuits.

Second of all, it seems to me ironic at best to argue that the Lessons Learned tells us we should use the heaters for natural circulation and so we should provide a connection to emergency power but -- and the Lessons Learned also says you should provide that without degrading the capacity of the emergency power. But we will just -- you know, if we we connect it and it degrades the capacity of the emergency power, then we will avoid running into the objection by not meeting the original Lesson Learned at all; in other words, not connecting the heater. What kind of sense does that make when you could solve both of the problems by making the heater safety-grade?

(Pause.)

JUDGE EDLES: May I ask a question while you are looking? Your question with respect to the delegation to the Staff, I looked at your brief, and I noticed you have a little footnote in there saying, by the way, the Licensing Board did have this subsequent procedure. Also, you did not, as far as I recollect, except to the Licensing Board's decision dealing with the implementation of the plan. Now, what conclusion shall I draw from all of that?

MS. WEISS: Well, I think some of those

exceptions are mooted.

JUDGE EDLES: The procedural aspect.

MS. WEISS: The procedural ones are mooted.

JUDGE EDLES: The question with respect to your argument for the need for some additional environmental assessment or environmental ijpact statement, as you refer to it in your brief, what I am unable to figure out exactly is what it is that you would litigate if we were to conclude that there had to be a full-blown environmental impact statement?

MS. WEISS: I am not sure we would litigate anything. I think that is kind of prejudging the result of the impact statement. Our argument was that NEPA requires that this is a procedure to which NEPA applies.

JUDGE EDLES: Because it is a major Federal action?

MS. WEISS: Yes.

JUDGE EDLES: Let me go to PANE now. As I recollect the PANE case, the Court did not indeed decide that question, but rather sent it back to the agency for a determination of whether this was a major Federal action. Am I right or wrong? Now, the Judges may in their heart of hearts have had a certain feeling as to where they would come out on this.

MS. WEISS: I think you are right that it is

not entirely clear. And I think I said that I thought the PANE case suggested it. It is certainly not dispositive of it. Yes, I think we have yet to know exactly how that is going to come out. But in any case, it is essentially the same argument, that this is a major Federal action and that the Commission essentially has to look at what it did not look at the first time around. And what it did not look at is the consequences, or the probabilities for that matter, of a Class 9 accident.

JUDGE EDLES: Okay. But I gather that you did litigate at least in one or two instances those matters which had a nexus to the TMI accident, although I appreciate you did not litigate the full range of Class 9 accidents. That is what I am trying to get at. What it is now that you would seek -- picking up on your statement that we must litigate things we did not litigate back when the original EIS was issued -- what is it you would attempt to litigate? Or are you suggesting to me that NEPA and the CEQ regulations require every agency to go through the hoops and I want the NRC to go through the hoops?

MS. WEISS: I hope it is not going through the hoops. If it is going through the hoops here, then it is equally going through the hoops on every operating

license and every construction permit that you issue. There is fundamentally no difference.

We talked some about the probablities, a little bit about the probabilities of accidents. UCS does not have the resources to litigate the probabilities of particular Class 9 scenarios, and we do not have any intention of doing that in an adjudicatory forum. What we would like to see the Commission do is acknowledge that it has responsibility under NEPA to lay out for the public what is the risk of an accident beyond design basis for TMI, both the probabilities and the consequences on that latter score.

I think the record would show, if it were made, that the consequences could be quite great at the site, that this is one of the worst reactor sites, in fact, in terms of population distribution. And then the Commission is required to weigh that in the balance before it restarts this plant.

Now, the question of what parts of that analysis we would challenge, what evidence we would bring in, is premature. I would like to think that we might get a reasoned analysis of the probabilities and consequences so that that would be on the public record.

JUDGE EDLES: Have you looked at the type of analyses that the Commission has done in the other three

or four cases? Is that the kind of thing I presume you would expect here?

MS. WEISS: I have looked at some of them, and overall that is what we expect. Overall, they follow the prescription of the Commission's policy statement on Class 9 accidents. In NEPA I think there are lots of things that are not right, particular parts that are not right about them. But those are to be raised in those individual cases.

JUDGE BUCK: I have one last question, Ms. Weiss. That is concerning Question II.A that we asked on July 24. This is concerning the Crystal River incident where they had some safety relief valves chatter and so on.

It is my understanding now from your writeup here that you are asserting that essentially the same valves are being used at TMI-1 and that no changes in those valves have been made since the Crystal River incident, they are changing location but you are saying they have not changed the valves?

MS. WEISS: I do not think we are not asserting they have not been changed. I think what we are saying generally, Dr. Buck, is that given the importance of the safety valves, considering the centrality of feed-and-bleed to this case, that is is

compelled that the record establish that the safety valves are qualified to perform that bleeding function. That the record does not clearly establish.

Now, we have been getting dribbling results from the EPRI test program. I am sorry, I may be answering the question you have not asked. I thought 2A was with respect to the EPRI tests. Yes, is 2A not the EPRI test?

JUDGE BUCK: Yes. Well, it includes the EPRI tests, but it came about because of -- our question was asked in terms of the Crystal River valve chatter.

MS. WEISS: All right. And our point is that every time these EPRI tests come up with a failure or an instability or some failure of valve to perform as it is intended, the claim is made that that does not apply to TMI for some reason or another.

The TMI valve apparently never gets tested or it never gets tested in a systematic way, in a way that would make a record upon which you can rely to make a finding that it is qualified to perform the bleeding function. And, in fact, as I said earlier, the valves are innocent until proven guilty.

In our view, this is just sort of the latest -- this is the time the valves did not do what they were supposed to do, and the Licensee claims you should not

worry about it because we are going to change the inlet piping with no indication of an analysis to support the finding that this new inlet piping is going to somehow cure the problem. A mere assertion. And against the background that the Staff concedes on this record that it has not even evaluated the nature of the demands on the safety valve during feed-and-bleed. And it is on this record that the EPRI test program cannot simulate these conditions.

So we are just saying to you that at some point, you know, it is not just a case where the record is just void, which would be bad enough because I think it has to be positive on the qualification of the safety valves, there is indication that these things keep failing, that is the latest indication.

JUDGE BUCK: You are saying you do not have proof that the TMI valves are any better than the Crystal River valves; is that correct?

MS. WEISS: For sure. And not only that, I thought it was interesting that, you know, we raised this issue, we litigated this issue during the hearing. I have cited some testimony for you on page 9 of our response to your questions. We quoted back to you the Licensee's testimony, which said, because of their construction there is no reason to believe that they

will fail. Yet the reason that they give for these valve failures is they were not constructed and designed for two-phase liquid and steam flow. You cannot have it both ways.

JUDGE BUCK: Okay. Thank you.

JUDGE EDLES: Thank you very much.

We will take a very brief recess and reconvene in about --

MR. BAXTER: Mr. Chairman, might I ask that we take a longer recess? There is quite a range of potential issues Ms. Weiss could have selected, but it would be very helpful to me if I could have at least 20 minutes.

JUDGE EDLES: Okay, why do we not take a 15-minute recess, if you do not mind? That would be more consistent with our objectives as well. We will reconvene at that time.

(Brief recess was taken.)

JUDGE EDLES: Please be seated and come to order.

Could I ask someone please to close the door in the back. Thank you very much.

Mr. Baxter, you have 55 minutes.

VOICE ONE: Gentlemen, we are citizens of Central Pennsylvania opposed to the restart of TMI-1 --

JUDGE EDLES: Excuse me. Could I ask you just to be seated until we have completed Mr. Baxter's argument. This is really not an opportunity for people to raise --

VOICE ONE: We feel that as residents of Harrisburg that we should have an input.

JUDGE EDLES: This is not really an appropriate opportunity for that. And I am going to ask Mr. Baxter to begin and ask you please to hold your comments.

VOICE TWO: We're here today to protest the actions of the Atomic Safety and Licensing Board in the determination --

JUDGE EDLES: Excuse me.

VOICE TWO: -- of whether the determination of whether GPU Nuclear should be granted a license to operate.

JUDGE EDLES: I appreciate your concerns. The

opportunity was made for individuals to raise concerns before the Licensing Board. This is an appellate proceeding based on the record --

VOICE THREE: But we are here today ---

JUDGE EDLES: Excuse me. May I ask for your courtesy in allowing me to finish, please?

VOICE THREE: Licensee volunteers --

JUDGE EDLES: I would be very reluctant to ask that the room be cleared of everyone other than the parties. That would not be a very sensible action. But I am going to ask people who are not participating in the formal oral argument please to exercise some courtesy as observers, and that we simply continue with the oral argument.

VOICE FOUR: We have not been permitted to argue --

JUDGE EDLES: Excuse me. We will take a brief five-minute recess at this point.

(Recess.)

JUDGE EDLES: Please be seated.

I want to reiterate the fact that our Board is sensitive to the concerns that individual citizens have with regard to what is a very, very important matter. I also want to emphasize very strongly that this is not the forum for presenting those particular concerns and

grievances.

Not that we are not interested, but we have ground rules that we have to go by here and it would be unfair to all of the parties in the case for us simply to entertain random comments from people in the audience. We are happy to have you here and listen, but I have advised the security people that if there continue to be comments from parties who are not participants in the formal proceeding that we will have to ask the entire hearing room be cleared.

I think under those ground rules I would like to ask Mr. Baxter to continue.

(Whereupon, many of the aforementioned members of the audience voluntarily left the room.)

ORAL ARGUMENT ON BEHALF OF LICENSEE
METROPOLITAN EDISON COMPANY

MR. BAXTER: May it please the Board:

I have several things to accomplish in my oral argument. The first is to argue in support of Licensee's exception number one, and also to argue about one other area of the Licensing Board's decision with which we disagree, but did not appeal, but are taking exception at this point to in response to UCS appeals, and that is with respect to emergency feedwater reliability.

I then have a couple of brief comments about the Union of Concerned Scientists responses to the Staff and Licensee answers to your questions, and then I will turn to a reply to Ms. Weiss' oral argument this morning.

The Licensee took only one exception to the Licensing Board's decision on plant design and procedure issues. That involved its conclusion that one of the long-term lessons learned recommendations should be read to require for the facility the installation of reactor vessel water level instrumentation in the long term. At the same time, as you know, the Licensing Board concluded that we have made reasonable progress toward that goal and that the short-term requirements for inadequate core cooling instrumentation has been met, so that there was no barrier to restart with respect to this issue.

This question involved the only major disagreement that Licensee and NRC Staff brought into the hearing room, at least in this proceeding, and I am a little bit surprised at the Staff's reply brief and I will give you my reaction this morning.

The Staff has opposed the Licensing Board's decision, as well as we have, on a totally different ground. The Staff has now stated in its reply to

Licensee exception number one that the Licensing Board used the incorrect view of what the word "necessary" meant under the Commission's August 9, 1979 order and notice of hearing, and that had the Licensing Board used the Staff's view of the correct standard it would not have held for the Staff but would have held for the Licensee, so that the Licensing Board should change its decision.

In doing this, the Staff has essentially not addressed at all Licensee's brief, which would argue that the Licensing Board's decision was erroneous on their own standard. They rely exclusively on that standard argument in response to the Licensing Board's decision.

We think the Staff is wrong in its view as to what the word "necessary" means under the Commission's order. We think the Licensing Board gave a reasonable interpretation of it and properly applied it in the proceeding, except for the two areas with which we disagree, and that is on reactor vessel water level instrumentation and emergency feedwater reliability.

The Staff does take the position, we note, that its argument is somewhat academic except for this issue of reactor water level instrumentation. That is, they say in response to the UCS appeal that UCS did not

prevail under either the Licensing Board's or the Staff's interpretation of what "necessary" means.

We think that the Staff's view of the word "necessary" is inconsistent with the concept of long-term modifications and assessing reasonable assurance and providing incremental improvements to safety over the long-term, which is recognized widely in this agency and in the order we are governed by in this proceeding.

We are also aware that, while the word "necessary" has been used in other show cause proceedings, including orders that were issued immediately following the TMI-2 accident to other B&W operating reactors, no Licensing Board to my knowledge or Appeal Board has been called upon to try and construe that word.

But the fact that the Commission allowed other B&W reactors to continue operating while they issued the orders in those cases, in which the matters to be considered would be the necessity, among other things, of the modifications they had directed be implemented, means to me that the Commission could not have meant what the Staff says it means by the word "necessary" in that instance -- items without which the plant could not operate.

We also think as a practical matter it would be an incongruous result to take the position that the Staff and the Commission operate under a wholly different interpretation of what "necessary" means than Licensing Boards and Appeal Boards do, especially when the Commission establishes them to review the adequacy of modifications that the Commission initially directs.

So we would ask you to review our exception under the standard that the Licensing Board applied to it and look at the merits of our argument that the Licensing Board misapplied that standard to the evidence in this case.

The other area of disagreement the Licensee has with the Licensing Board decision is with emergency feedwater reliability. We did not appeal their decision because they imposed no additional short or long-term modifications to those recommended by the NRC Staff, except in the area of main steam line rupture detection system, and we have not opposed that additional requirement.

The Licensing Board did conclude, however, that we had not made an adequate demonstration of the reliability of that system, not only in the long term but after its modification to be completely safety-related, and instead placed reliance upon feed

and bleed cooling to find that there was adequate decay heat removal capability at Three Mile Island Unit 1.

This essentially puts feed and bleed cooling within the design basis of this plant for the first time, and to my knowledge for the first time for any operating reactor in the country. We think the Licensing Board decision on this matter is inconsistent in major ways with the holdings they made on other very critical issues in the case.

Particularly, I have called attention in our brief to the fact that in looking at how the Staff and the Commission have defined design basis events and how they have made their overall judgments about what modifications ought to be undertaken at reactors in response to the TMI-2 accident, the Licensing Board endorses a health mix of probabilistic and deterministic analyses in making these judgments. In fact, specifically in response to the UCS criticism of that methodology, the Board acknowledged that Staff engineering judgment plays an important role.

I find it, then, hard to understand why the Licensing Board analyzed emergency feedwater system the way it did, because it essentially ignored all the Staff and Licensee evidence with respect to the deterministic evaluation that had been conducted and concentrated

wholly on an effort that we feel is misguided and flawed to conduct the quantitative analysis of the probability of failure of that system.

The Board accuses us of taking the position that just because there is no reliable data available they shouldn't inquire into the safety of the system. And that of course was not our position, and we took great efforts to try and convince them that with the modifications undertaken that that system will be reliable.

We simply question whether this is, in the Board's own words, an appropriate case for applying that kind of an effort, and especially to the exclusion of all others. The Staff explained in great detail the origin and the development of its criteria for emergency feedwater systems, both before and after the TMI-2 accident.

Our evidence shows the fact that the emergency feedwater was not available for eight minutes of the accident did not have implications for the subsequent course of the event. In spite of that fact, the Commission has taken extensive review of the system. It has been looked at.

The Applicant -- the Licensee in fact has undertaken fault tree and probabilistic analyses of

these systems. They were performed by B&W, and the Staff has done it, too. Not with the goal in mind, however, of reaching some kind of black and white, up and down final number, but to do what I think those kinds of analyses can do best in this situation, that is identify where the major contributing to unreliability and unavailability are and to use that information to suggest to yourself what ought to be the modifications that are made.

That is how that technique was used, and I think successfully so, by both the Staff and the Licensee in this case, and by the rest of the industry as well. It is incongruous to me that in the end the Licensing Board had no particular modification in mind that it would like to see accomplished on the emergency feedwater system that isn't already being undertaken. They essentially have endorsed the adequacy of the short and long-term recommendations in this area, even though they reached the conclusion that it is not going to be adequately reliable.

We think in this instance they were concentrating too much on only one aspect of regulation, that is the effort to quantitatively assess unreliability of equipment and ignored the considerable engineering judgment and improvements that have already

been accomplished here.

JUDGE BUCK: How did the Licensing Board come to its figures on the probabilities and so on, do you know? There is not much said in the decision as to exactly where those figures came from. Maybe I have missed something in that, but --

MR. BAXTER: I believe, from listening to the hearing over the months, that it started with NUREG-0560, which was a Staff study issued on May 7, 1979, within a few weeks of the accident, on feedwater transients that occurred at B&W plants. And Administrative Judge Jordan took what he thought was the failure rate of main feedwater in that document, which it wasn't. It was a listing of main feedwater transients.

And then he also garnered from Staff witness Lance during cross-examination testimony to the effect that an examination of Licensee event report data would show that out of 200 reactor years of operation there have been eight failures of emergency feedwater to respond, although Mr. Lance said a lot of that occurred in startup and shutdown, for which emergency feedwater is not used at TMI-1. And the differences in design would make some of those events impossible at TMI-1.

I can garner some information on where the

data came from. It's just my contention that it is inhistorical and inapplicable to TMI-1.

Turning for a brief moment to UCS' comments on the responses to the Appeal Board's questions -- and I won't go through them all; they are lengthy -- I would only point out that generally speaking UCS has misunderstood our table in response to the percentage completion of various items to be done.

We reported to you the percentage completion as of today. They interpreted it somehow as what was going to be done at the time of restart, and of course that's not the case.

JUDGE BUCK: I believe one of their objections was that a percentage alone doesn't mean very much because a critical item might be missing on that ten percent that was left, or such a thing as that. I guess that's the way I read their objection to the table.

MR. BAXTER: I'm not sure I'm going to defend -- we did what we were asked to do. And as I say, in the short term requirements, of course the Staff is required to report to the Commission that those items have been satisfactorily completed. It indicates 95 percent. I don't think it's going to stay that way before TMI-1 restarts.

The other problem that plagues UCS' comments,

as it does much of their reply brief, is the assumption that when a given piece of equipment or a system is not fully safety-grade for all functions that it evaporates. And of course it is our contention that it does not evaporate, that for a given safety function it is still there. And they failed to make that in their comments as well as their positions in this case.

Turning now to --

JUDGE BUCK: Going back to the safety-grade situation, what I was trying to get at on general design criterion one, you feel that -- I gather your remark now is that the functions to be performed situation on a safety-grade piece of material depends whether it's in operation or whether it's for use in an emergency situation or whether it's only part-time, and that sort of thing.

Is this where you get the variations in the level of safety?

MR. BAXTER: Absolutely. I think general design criterion one and the concept and philosophy it introduces, which we think is consistent with the rest of the criteria, fundamentally establishes that concept, that there are differing levels of quality for different pieces of equipment in different functions. And that's why, as we point out -- the prime example of the PORV,

which is a reactor coolant pressure boundary function, but not for the control function it has of lifting in response to reactor coolant system pressure prior to a safety valve, which is behind it to back it up, and which is required to perform that overpressurization protection function.

That is the underpinning of Mr. Conran's testimony and I think it's the underpinning of the entire scheme this regulatory agency has followed, despite Ms. Weiss' protestations that it is not within their experience.

If I may then turn to Ms. Weiss' argument this morning, I think one of the things we would like to emphasize that the Appeal Board keep in mind when they are reviewing the exceptions that UCS has advanced in the arguments they make is what contentions were actually admitted into this proceeding in the beginning and what the focus of the hearing was supposed to have been.

This is not a procedural nicety I'm talking about when we complain in our papers about proposed findings that don't cite to the record or issues and concepts that are raised for the first time on appeal. This is an extraordinary proceeding. This was suspended summarily with a hearing to be held thereafter. I think

uniquely in this kind of context the Licensee, who has the burden of proof and who has been harmed by this procedure of having the public hearing precede restart of the reactor, has every right to insist that the Commission's procedural regulations be followed closely, because where we have the burden we at least have to know what we are called upon to defend.

I cite for one example UCS contentions 1 and 2, on forced and natural circulation. You'll find a lot in the brief about whether or not feed and bleed operation is a complex one for operators to undertake. The contention addresses whether there is adequate shielding from radiation.

JUDGE EDLES: I understand the burden of proof argument you're making. I'm not quite sure I understand what aspect -- what harm to the Licensee, what bearing that has. The Commission made a finding at the time of the accident that it lacked a reasonable assurance that the plant could be operated safely. As a consequence, it felt that allowing it to operate at that time, presumably, there would be potential harm to the public.

I don't think I understand where the harm element comes in in terms of your argument to us here.

MR. BAXTER: It's simply because that was the

decision of the Commission, that the restart could not take place until the hearing process took place, and the results of that hearing would have presumably a major impact on the Commission's decision on whether to allow restart of the reactor, that it was a particularly important time to be careful about what was being litigated, what are the allegations against restart that are being raised, do we understand them so that we can defend ourselves in that situation, rather than having new arguments raised at various points in the proceeding.

Ms. Weiss in her opening argument characterized UCS' case as being a mere examination of NUREG-0578, the short-term lessons learned recommendations, and questioning whether or not the Staff has adequately implemented those recommendations. In fact, of course, nowhere in the Lessons Learned Task Force document will you find a recommendation that the PORV or the heaters be made safety-grade.

In any case, the adequacy of those recommendations were of course what the hearing was all about. Her sense that at many times they were alone in this case I think is justifiable, because, as I have described with respect to the emergency feedwater system, the same can be said of the overall design of

the B&W systems.

I don't think here's any question that the agency has done a multi-disciplined and multi-methodology review of this kind of a reactor system, and yet, while other plants were allowed to operate, TMI-1 was not.

There is nothing unique about the design of this plant. We are not resting on that, we're not relying on it, and we're certainly not threatening anybody about it. But I think it's just an important fact to have in mind to understand the context of their case.

There's a complaint that we have generally not made things easier for the operator because we have not made the pieces of equipment safety-grade that UCS recommends be done. In fact, that's a major consideration of why we have chosen not to follow UCS design suggestions. We believe the ideas they have suggested would cause unnecessary complexities to the plant, and we think that's one of the lessons learned from the TMI-2 plant.

UCS ignores the changes in the control room and the equipment up there as a result of the lessons learned in the TMI-2 accident, and it wasn't just as a result of the NRC requirements. Long before it became a

requirement, GPU Corporation hired one of the best teams of human factors consultants in the country to review the TMI-1 control room and to make modifications on its own in advance of any Staff review and recommendations. This was litigated at the hearing by Mr. Sholly, who did not appeal the Licensing Board's recommendation on the control room.

We made his job a lot easier by increasing the indication he has in the control room, with respect to emergency feedwater automatic initiation, the location and status of the PORV and its block valve, steam generator level. And there are numerous examples of that kind where we feel the procedures have been improved, the training has been improved, and the operators indications in the control room have been improved to facilitate his job.

In fact, that's what we believe were the lessons learned from the accidents and that's what we've done to pursue that concern.

Ms. Weiss talked about the fact that we falsely accuse them of being concerned with equipment design. I'll leave the record to your reading. I think it's a fair view that Mr. Pollard's case -- and that's of course what we were litigating, their contentions; they somewhat set the direction and course of the

hearing by what their allegations were -- Mr. Pollard's case is uniquely made upon design and hardware changes that he feels should be made.

The allegation is made that it was up to them to fill the record with plant procedures and attempted cross-examination. I can only say that when the TMI-1 supervisor of operations was on the witness stand there weren't any questions about operating procedures. It was only when a high officer of the company was there that he was questioned about details of the plant operations that he couldn't be expected to know in his function.

The scenario Ms. Weiss has postulated about feed and bleed cooling is not a new one. We do dispute strongly her argument that feed and bleed cooling is needed for design basis events. She gets there by stating that one must postulate no feedwater at all, no main or emergency feedwater, as a design basis event at TMI-1. We disagree with that for loss of main feedwater and small break loss of coolant accident events, and the record is uncontradicted on that score.

It is recognized by everyone that the capability to control emergency feedwater independent of the integrated control system at TMI-1 is going to require operator action, and the Licensing Board knows that. It is for that reason, among others, that there are increased indications about loss of ICS power supplies in the control room; that there is the new indication for emergency feedwater flow and steam generator level that I indicated before; and why the operators have been trained in a control station established in the control room to exercise control over the emergency feedwater control valves in the event of a failure in the ICS.

There is nothing that I am aware of in regulatory standards or in the case law that says that just because operator action is required, therefore

there is not safety grade operation in being, if indeed there is adequate time and he is adequately trained. And we claim it is appropriate, as does the Staff, to take credit for that operator action in bypassing ICS should the need arise.

With respect to the power-operated relief valve and whether the block valve is safety grade, which is a question you were exploring, Judge Buck, with the Union of Concerned Scientists, it is environmentally qualified, and we believe that is sustained by the information we have provided for you in the record. It is not safety grade except for the reactor coolant pressure boundary function in the sense that there are not two of them, and it has one set of circuits, et cetera.

JUDGE BUCK: I don't know whether I got hold of the whole record on the safety grade of the block valve situation. One of your witnesses -- I was just trying to find it here; I think it was Mr. Jones, or I have forgotten -- was asked some questions about the type of testing that was done on the block valve as to temperature, pressure and this sort of thing. There were a couple of answers which he apparently did not personally know and said so. That was never amplified on the record after that, as I recall. It was just left

there.

Is your statement now that the block valve and its connections are safety grade?

MR. BAXTER: It is our position that they are environmentally qualified. I don't think I can say they're safety grade in the sense of being commonly used.

JUDGE BUCK: In what respect are you saying that?

MR. BAXTER: There's only one, so there's not complete redundancy.

JUDGE BUCK: There is not a redundancy of safety grade valves, in other words.

MR. BAXTER: That's right. There's one block valve for the PORV.

JUDGE BUCK: Other than that is it your statement that they are safety grade or it is safety grade, the valve itself, and the electrical connections? Is that correct?

MR. BAXTER: The hardware is safety grade, and the equipment is all environmentally qualified. In my layman's understanding that should be safety grade.

JUDGE BUCK: Okay.

MR. BAXTER: I'm reminded at this point of when you mentioned testing, of course there was a UCS contention at one time, UCS Contention 6, about the

adequacy of the testing program for safety and relief valves. This is one of several contentions that UCS abandoned and the Licensing Board pursued.

I think it is at best interesting to hear the complaints today about the adequacy of that testing program when in fact UCS abandoned the issue at the hearing. That is not the only instance that I heard today. Also complaints about the adequacy of our small break LOCA models to predict the behavior of the reactor coolant system, and, of course, that was also the adequacy of our analyses was one UCS contention that was abandoned and pursued by the Licensing Board and was not followed up by UCS either in proposed findings or on appeal here to this Board.

JUDGE BUCK: In that respect there seems to be some difference of opinion between yourself and the Staff on the models used on small break LOCAs as to whether the models have been fully tested, have been analyzed mathematically and so on. But there seems to be some question as to how thoroughly they have been tested on actual equipment.

I go back, I think it is, to some reference to some German data at GERTA, and I don't know what the German data is, and I don't know what GERTA is, but I understand it's a plant of some sort, a test facility

you have up in Ohio somewhere.

But my problem is knowing what sort of testing has been done and what is left to be done and what the GERTA facility has to do with it and how the Staff gets involved in that particular situation. I don't know whether you can answer those questions or not, but it is wide open in the record as far as I can see.

MR. BAXTER: Well, first of all, let me say that there is no question in the record about the Staff's position that TMI-1 conforms with 10 CFR Section 50.46. To the extent the Commission's regulations require benchmarking for codes in order to meet that regulation, I believe their position is unaltered that we have benchmarking if the models do accomplish that purpose.

The Staff is interested as part of their long-term effort to explore and improve our understanding of small break LOCAs and having some additional integrated system testing done because of a concern they have that the existing test facilities may not adequately represent the particular B&W design. And the Staff is, to our view, incongruously pursuing that interest under NUREG-0737, item II.K.330.

If you would like to know exactly what kind of benchmark testing was done for the original analyses and

what GERTA is, I do have Mr. Jones here; and in the spirit of our presentation this morning he could respond.

JUDGE BUCK: Well, that's bothered me, because there are a series of indications that seem to go up and down between yourself and the Staff and the Babcock and Wilcox owners group and the Staff. And I must say that things seem to go up and down. The Staff at one point seems to be satisfied; the next letter they have something else to complain about. And I'm not quite sure where they stand. I'm going to ask the Staff in a little while, but I'm not quite sure where they stand on some of these things.

And I want to first of all find out where you think they stand, and if we go back through this whole series of letters starting back in December of 1980 and running on out through July, things seem to change back and forth as to what analysis the Staff has approved and what it hasn't approved and what more needs to be done and so on.

I am left with the feeling right now that I'm not sure what has to be done or what has been done.

MR. BAXTER: Well, it's certainly my understanding in the context of the issues being looked at at this hearing that the Staff has now altered its conclusion that TMI meets the regulations, and as to the

short and long-term requirements stated in the Commission's order for this proceeding that we provide improved operator guidance for small break LOCAs based on new analyses, based on the TMI-2 accident, that the Staff is satisfied with that effort and the procedures that have been adopted and put into place.

Their safety evaluation report and its Supplement 3, which is in evidence here, concludes that we have made reasonable progress on the long-term interest they have in pursuing small break LOCA modeling refinements. But to say they're satisfied, it's clear from the correspondence they're not totally satisfied. They would like us to build a big new test facility and run some more tests, and we think there are some other steps that more logically should precede that, including looking at the results of these GERTA tests that are being done out in Ohio and some of the other efforts that the industry has proposed before we go out and build the new test facility.

JUDGE BUCK: So your main argument here is how much more testing and how big a facility you have to do it, and whether the GERTA facility is suitable, is that correct?

MR. BAXTER: That's the way I would characterize it. I'm getting nods.

JUDGE BUCK: He nodded. Okay.

Well, is the GERTA facility a similar situation to the MINI-SCALE or the LOFT testing facility? Is that the sort of thing it does at this facility?

MR. BAXTER: This is Robert C. Jones, Jr. of Babcock and Wilcox who was a witness in the proceeding.

JUDGE BUCK: Mr. Jones, I'm not up to date on all the test facilities around the country. When I saw German data from GERTA, I sort of linked -- I knew nothing about it. I would like to have some little explanation of what you're doing and what you plan to do.

MR. JONES: Well, the GERTA facility was built at the Alliance Research Center at B&W for our German partner that we have a part holding in. It simulates a B&W system. It's a scale facility, and it's very similar in its nature to the SEMI-SCALE facility out in Idaho. It's full height, about 2 1/2, 3-inch pipes, about 70-foot tall hot legs, 20-foot tall vessel. Its main purpose is to look at natural circulation phenomena, two-phase flow phenomena, interruptions in natural circulation, boiler condenser. Those are the types of tests that we are intending to run on that facility.

JUDGE BUCK: Okay. So you say this is a

cooperative thing, the Germans are involved in this. This is where the German data comes in, is that correct?

MR. JONES: Yes. GERTA is a German acronym. They originally contracted with us, and GPU has stated that they would be willing to buy that data and submit it to the NRC.

JUDGE BUCK: The facility is basically a mockup for the B&W-type plant, is that right?

MR. JONES: That's correct.

JUDGE BUCK: And it's intended to match TMI amongst some of the others?

MR. JONES: It is not a direct match to the TMI facility. It is more our 205 raised loop type facility. The significant item is the behavior of a once-through steam generator as opposed to a U-tube steam generator which is being tested out in LOFT and SEMI-SCALE. So in that sense while it's not a scaled-down version of TMI, the phenomenon that it will represent or that it will mock up will be relevant to a TMI facility and benchmarking the codes that would be used to predict that performance.

JUDGE BUCK: Is this load something that represents a candy cane setup, for example?

MR. JONES: Yes. There was great care -- in fact, one of the significant items in the facility is

the care in the scaling of the hot leg flow regimes on the candy cane in order to ensure that that relative phenomena would be preserved.

JUDGE BUCK: Okay. Thank you very much.

Sorry, Mr. Baxter. I've got some more questions that may come up like this later on, but not on this particular subject.

MR. BAXTER: I am going to, I should have mentioned at the beginning, yield the podium after I conclude to my co-counsel, Mr. Trowbridge, to address the UCS contention on connection of the pressurizer heaters to the diesel.

I will conclude with the UCS argument on equipment qualification by expressing my disagreement with Ms. Weiss' reading of CLI 80-21. I find nothing in there which says that the standards under which TMI-1 and other licenses were issued are inadequate. Indeed, the Commission does state that the documents, the DOR guidelines in NUREG-0588 that they were making in that decision, now the basis for compliance for GDC-4 it states are more detailed, but it did not make the finding that the standards were by definition inadequate.

And in spite of her best efforts to construe CLI 80-21 to read something else in the Commission's

petition, the Commission's decision on their petition to reconsider that decision and the Commission's latest statement which Judge Eiles read today, the Commission has made the judgment that operating reactors may continue to operate while this program is concluded, subject, of course, as that decision states clearly, to the obligation to report and replace equipment promptly when it is determined that it is unqualified.

There is really no other way to read that, and it's my view the Appeal Board is governed by that that the Commission has read. And if Ms. Weiss and UCS strongly felt that the Commission was taking illegal action in making those determinations, I can only note that they have not gone to court in response to either of those decisions to overturn it.

The point was also made that the Lessons Learned from the TMI-2 accident are not covered by the rule. I would point out that that is the one thing we attempted to put before the Licensing Board in connection with this issue is what is the equipment qualification Lessons Learned from the TMI-2 accident, which was flooding due to submergence. And that is the one thing we do feel was litigated adequately before the Licensing Board.

If there are no other questions for me --

JUDGE BUCK: I would like to continue. I want to go back to question 2-A, the question I asked Ms. Weiss about earlier. This involves the use of the safety-related valves and the current or incident.

MR. BAXTER: Crystal River you said earlier.

JUDGE BUCK: I've forgotten which reactor it was. Anyway, the relief valves popped two or three times and ended up with scarred faces and so on. And in your reply you say that one of the problems here or the major problem was the fact that the piping length ahead of the valve was too long, and you planned to shorten it up and so on.

Ms. Weiss brought up the question as to whether or not the valves themselves were actually designed for the type of operation that you are likely to get here; that is, a two-fluid flow. And, also, whether or not the TMI valves have been tested over a full range of pressure and temperature, in which they are likely to be used.

Could you give me some answers on that?

MR. BAXTER: Well, I am looking at our response to your question 2A. I am at a loss somewhat, Judge Buck, as to understand how the Crystal River event might come into play here.

It is my understanding that in that instance, the valves did work properly. In fact, they lifted a little bit early, but that there was flow passed.

JUDGE BUCK: My understanding was that the valves got scarred.

MR. BAXTER: That may well have been, but they worked.

JUDGE BUCK: No. What I mean is, it is the same kind of valve. Are you going to have the same kind of situation when they are used at TMI? That is what I am concerned about. Is it the same kind of valve? Have they been tested? Will they handle two fluids or not?

MR. BAXTER: The adequacy of the valve testing program, there is a record on that, and both staff witnesses, Mr. Zudans and our witness, described what the EPRI safety and relief valve testing program was going to do. And it is testing and has tested the safety and relief valves under two-phase flow. This is what we reported to the Appeal Board not long ago about some troubles that were encountered with the kind of

valve that is on TMI-1 with the particular piping inlet configuration we have.

These tests do cover a range of pressures and temperatures, and those tests showed that the same valve but with a short inlet configuration would successfully pass the two-phase flow. And that is a modification we are undertaking to make at TMI-1 prior to restart, to modify that piping.

JUDGE BUCK: It is not in the design of the valve itself? If it has a short intake line and inlet line, that the valve itself will react properly under two-phase flow? Is that correct?

MR. BAXTER: That is what the tests showed and the information we provided to you shows -- the valves will work with that inlet configuration.

JUDGE BUCK: I want to go to highpoint vents. It is my understanding now that you have a highpoint vent on the pressrizer at TMI but are delaying the installation of highpoint vents on the pressure vessel itself and the candy cane, the upper part of the candy canes, until after the end of cycle 6, I guess it is.

I am a little surprised at this because back early in the hearings, particularly at transcript 4909, Mr. Keaten appeared to commit the licensee to having those vents installed before restart.

MR. BAXTER: I can only say that I will check the transcript when I get the chance, Judge Buck. But my recollection is that Mr. Keaten said it is our current plan and intent to do that, but that our licensing commitment was to meet the schedule required by NUREG-0737, which of course changed over the course of the hearing if not after the hearing.

JUDGE BUCK: Well, let me just doublecheck.

JUDGE EDLES: I gather, though, that the vents will not be installed before restart?

MR. BAXTER: Except on the pressurizer.

(Pause.)

JUDGE BUCK: The question actually was asked by Mr. Cutchin. He asked Mr. Jones first and then Mr. Keaton. The question was: "If indeed there is no feedwater available, do you know whether or not these highpoint vents will be in place prior to restart?" And Mr. Keaten said, "The licensee has committed, to my knowledge, to have highpoint vents in the reactor hotlegs in place prior to restart."

MR. BAXTER: I would hope he corrected that statement, Dr. Buck. In our response to your questions on page 15, I cite testimony by Mr. Keaten approximately 12,000 transcript pages later to the effect that the installation of the highpoint vents was not a

pre-restart commitment, although installation by restart was previously thought to be possible. So I think if there was a mis-statement on the record, we did subsequently clear up with the Licensing Board what our intention was.

JUDGE BUCK: Why has not been possible?

(Pause.)

MR. BAXTER: I don't know anything more than we have said in our answer, Judge Buck, which is that the design has simply not been concluded.

JUDGE BUCK: Well, in one of your answers -- I am trying to find --

MR. BAXTER: Of course, the Commission's new hydrogen control rule would not require that.

JUDGE BUCK: I know they postponed that, but this is not in connection with hydrogen. This is use of the highpoint vents in order to prevent hydrogen, shall we say, to begin with. And that is to enable natural circulation to take place and so on.

It seems to me that there is an important role of the highpoint vents they will play in reducing steam bubbles, for example, which occur occasionally in B&W reactors.

MR. BAXTER: Well, it is my understanding that this is the only Commission requirement for installation

of these vents, and I think our testimony shows that the core is adequately cooled without highpoint vents for the purpose of establishing or maintaining natural circulation.

I think this highpoint venting function is really the purpose, it is my understanding, that the vents are being installed to perform.

JUDGE BUCK: That may be your understanding, but some of your own witnesses have -- well, for example, there is a letter from Eisenhut to Memo that says, We understand operators will be trained to use highpoint vents to remove any steam bubbles." And later, your witness Jones discussed the use of highpoint vents to remove steam from the upper regions of the primary system as a reason for not requiring the reactor coolant pumps to be safety grade.

So my problem here is there initially seems to have been a commitment and there has been a gradual sliding back from that commitment to have these things in before restart. And I don't think these are that difficult to install, are they? Or is it a major job?

I am just trying to get the reason as to why early in the hearing, well over a year ago now, there was an implied commitment, and then as one goes through the course of the hearing, that commitment was dropped

slowly. And then, reliance on the fact that the Commission put off the use of highpoint vents until after the restart, after July 1st of 1982 on the basis of hydrogen. This is a different basis altogether as far as I am concerned.

MR. BAXTER: Yes. And as I said before, I don't know that the Commission has required these vents, or the other basis you are speaking of.

Mr. Jones may well -- I haven't studied the transcript today; maybe you have -- may have said that the vents could be used for that purpose. You have to understand that in the course of that proceeding, lots of events were postulated. Lots of scenarios were added on one to the other, and it wouldn't be unusual for Mr. Jones to talk about the fact that that equipment could be also used for that purpose if and when it is there.

I am not familiar today with the exact design process and procurement process that is involved with the highpoint vents and I can't tell you whether it is a difficult job or not. I can tell you that we in the rest of the industry have constantly found ourselves having to reprioritize which one of these modifications should be done in which order. While any one item may not look to be that complex, it is an array of modifications which is quite vast.

JUDGE BUCK: A highpoint situation, the way B&W has there, which is really the highpoint in the whole system, the top of the candy cane just cries out for some sort of a venting situation to prevent blocking of natural flow, natural circulation. So -- well --

MR. BAXTER: We are, of course, as we said in our answer to you, planning to have that in by the first refueling outage.

JUDGE BUCK: I realize what your commitment is now, but I am bothered by the fact that there was a very strongly implied commitment made at the beginning of the hearing that you would have them in, and now that has disappeared.

MR. BAXTER: I think it disappeared before the record was closed, Judge Buck. We did have to change our testimony in that regard for reasons which intervened. I think the second piece of testimony was sometime in March of 1981, and the first one was in the fall of 1980.

JUDGE BUCK: All right. I have got some other things I wanted to go over very quickly.

JUDGE GOTCHY: One quick question. The reactor head vents are going to be installed at the same time you do the hotleg vents?

MR. BAXTER: That is correct.

(Pause.)

JUDGE BUCK: There is a question on the steam generator bypass logic. As I understand that system, you have essentially dropped out the emergency feedwater system from that logic by installing the cavalcading venturis and applying the rupture detection system only on the main steam line, the main water system, not on the emergency feedwater system. Is that correct? And is the main feedwater system itself the primary feedwater system, is it safety grade, as far as you know?

MR. BAXTER: No, the main feedwater system is not safety grade.

JUDGE BUCK: How about the rupture detection system, is that safety grade?

MR. BAXTER: The main steam line rupture detection system is not, either. Not now.

JUDGE BUCK: We had a question about inplant communications, and this was brought up sometime early in the hearing, and I think that at the time it was brought up in the hearing, the indication was that this would be completed by mid-1982. And the indication now in the record is that you have just hired consultants within the last two or three months, and that it will take them at least six months to come to a point of

making some recommendations, and it would take some time beyond that for you to completely fulfill the recommendations if that is the case.

Now, in the meantime, I don't know why it has taken them so long to get consultants. It seems to take them a year to get the consultants instead of a year to get the solution. But in the meantime, has the licensee done anything in the way of trying to improve the communications system that you have?

For example, one thing that was brought out was the personnel attitude in the plant regarding the use of the paging system, and some frivolity, shall we say. Has that been looked at? Has anything been done about that by the management?

MR. BAXTER: May I consult?

JUDGE BUCK: Yes.

(Pause.)

MR. BAXTER: I am advised that new pages have been added to improve inplant communications in some areas, and that a policy by the company has been promulgated that any employee caught using the communications system in a frivolous way will be terminated. And it is the impression that that has been successful to some extent.

JUDGE BUCK: Incidentally, maybe one of your

technical people could answer this. What is the speed of operation of a block valve? Do you know? The PORV block valve, I mean?

MR. BAXTER: We don't know, Dr. Buck. There is no one here who knows.

JUDGE BUCK: No one knows the velocity?

MR. BAXTER: We had 35 witnesses in the design phase of the case and they are not all here.

JUDGE BUCK: Okay. I think that is all I had. Rich, do you have anything you want to ask about?

JUDGE GOTCHY: I have a few questions here on the water level instrumentation question. Have you read the August 9th affidavit that was presented by Mr. Philip from the NRC staff?

MR. BAXTER: Yes.

JUDGE GOTCHY: It quotes on page 6 a definition of inadequate core cooling which came from B&W document number 86-1120838-00 dated August 1980. And he noted that that definition of inadequate core cooling was acceptable to the staff. And I have a series of questions about this.

Are you familiar with that definition from Babcock & Wilcox, May 1980?

MR. BAXTER: Yes.

JUDGE GOTCHY: Do you know the reason that

this definition was not accepted by GPU as the basis for its response with regard to water level indication?

JUDGE BUCK: I think we explained in our testimony, our written testimony prefiled on this issue, Judge Gotchy, that in fact, the definition you are seeing out of the old B&W report was the commonly accepted vernacular about what inadequate core cooling was.

When it got time to actually consider the staff's position and proposal about reactor water level instrumentation, we were carefully parsing out what did they want in the way of performance that we don't already have. We got down to this concern about was it participatory or wasn't it, and what is inadequate core cooling. And I think we sharpened our pencils, if you will, and it was recognized that this was a little bit too sloppy and a little bit too general in terms of providing a precise definition of inadequate core cooling.

JUDGE GOTCHY: As a matter of fact, it is very similar to the staff's definition. The way I read it, inadequate core cooling does not begin until the reactor vessel water inventory falls below the top of the core, thus increasing the fuel clad temperature. That represents in my mind going from the 1980 B&W definition

to the definition that you have taken based on 10 CFR 50.46; a significant change.

Now you say when the fuel is uncovered to an extent and/or for a period of time such that the limits of 10 CFR 50.46 would be exceeded. And I presume you are referring there to the acceptance criteria for ECCS peak cladding temperature of 2200° F.

Are you aware of anyplace in the record which explains this apparent -- which I regard as almost a 180° shift by Babcock & Wilcox on the question of inadequate core cooling?

MR. BAXTER: Well, it is explained in the record in the testimony that I just alluded to. I think we were very candid.

JUDGE GOTCHY: In the prefiled testimony of McKean, et al?

MR. BAXTER: That is right, in explaining that the commonly understood -- I don't think I cited this Babcock & Wilcox report, but it certainly is included in the definition of commonly understood industry usage prior to the time of that testimony.

It is also my impression from reading Mr. Phillips' defintion, I must say, Judge Gotchy, that the staff has come around closer to our definition. I am looking for the exact words and I can't find them at the

moment, but they seem to have recognized that it is not just simply core uncovery but the potential for actually heating up the fuel that is now what they consider to be inadequate core cooling, too. So we have come closer together.

JUDGE BUCK: Are you referring to the two-phase froth level definition that Mr. Phillips had? I think it was Phillips that had this. Yes, he came up with the definition about the two-phase froth level begins to drop below the top of the core.

JUDGE GOTCHY: I think the current standard --

MR. BAXTER: Okay, I am looking -- that is the definition used at the hearing, but I am looking at the bottom of page 4 where it says, "The staff considers the core to be in a state of inadequate core cooling whenever the two-phase froth level doesn't just fall below the top of the core, but the core heatup is well in excess of conditions that have been predicted for calculated small break scenarios for which some core uncovery with successful recovery from the accident has been predicted." I don't think that goes as far as our definition but it takes a big step.

JUDGE BUCK: He says that that definition is consistent also with the two NUREGs that he cited and may be regarded as an official definition of inadequate

core cooling reactor coolant level. I have some questions for the staff on that later.

In the case where you are tied to this 2200°F acceptance criterion, doesn't that greatly reduce the response time that you would have before you are going to end up with clad failure? I think the concern of the staff and a number of people has been that if you wait until -- if your criterion is that it is okay to go to 2200°F before somebody blows a whistle, that you may pass, you may go by 2200°F so fast that you could end up with clad failure before you could correct it.

MR. BAXTER: There are two different things here, Judge Gotchy. We are not saying it is okay to get up to 2200°F. In fact, the B&W operator guidelines that have been developed for inadequate core cooling use a correlation between thermocouple exit temperature and 1400 and 1800°. 1800 is our last step effort, and there is no intent on our part to have the operator actions dictated solely by 2200°.

But we are searching around for some Commission expression of what they consider to be adequate core cooling in terms of reactor temperature, and that is the only one we know of.

JUDGE GOTCHY: This was a question that came to me, I guess, when I was reflecting on what I had read. As I understand the arguments, they generally get down to the fact that a water level instrument probably would not result in any change in operator action towards mitigating an accident.

However, I wonder if direct indication of water level for a slowly evolving accident like they had at TMI-2 might not be useful to the GPU emergency director or emergency support director in formulating protective action recommendations if, in watching the trends of water level that they indicate the HPI is unable to keep up with the water losses and the long-term prognosis is for uncovering the core and possible large releases of noble gases and halogens.

What I am saying is that kind of indication if it occurred earlier would allow more time for both the emergency director or the emergency support director to take action and also to notify the public and emergency workers. Have you considered any of those possibilities? I understand this is design, and it was kept separate from emergency planning. But it seems to me there is some implication here with regard to possible use for an emergency situation to the off-site population.

MR. BAXTER: Well, to the extent -- and it is our position that the current instrumentation that is available at TMI-1 to detect inadequate core cooling is going to provide us with knowledge adequately in advance of a degrading core situation through the saturation meter and the in-core thermocouples. And this information, which we feel is adequate for the operators who are manning the facility, is going to be adequate for the emergency operations people to decide what to do as well.

And the same problem that we see in the operator's use of direct water level instrumentation applies equally to emergency planning. There are small-break scenarios, and this is described in our brief as well, where the water level will temporarily dip and yet the analyses predict full recovery and there is not going to be any problem with keeping the core adequately cooled.

I think for the same reasons we do not want the operator misled, we would not want emergency actions taken that were unnecessary that could have their own adverse consequences if they are not actually needed.

JUDGE GOTCHY: However, in the event of an emergency where you had an emergency director there and an emergency coordinator, presumably these are senior

people who could perhaps be able to make better use of this information and an operator who I would realize is faced with a lot of responsibility in trying to respond correctly in a short period of time according to procedures that have been developed.

It is not his concern to be worried about off-site consequences per se. It is to get the accident under control. I am just wondering if for some of the more senior people if that kind of information might not be useful in an emergency as opposed to a calculated result where they do not know where the water level really is and whether it is going up or down.

MR. BAXTER: Well, first, I would say that I am not totally familiar with what the manning requirements are, but I would suspect that by the time we got to this situation there would be senior people there watching what the operators did as well.

But I see no reason why they would want to make decisions on the basis of water level, given what we know about the potential misleading character of it in certain areas, any more than the operator would. And we had senior people from the company, including Mr. Keaten, who testified that he was not in favor of this instrumentation. It is not just the operations.

JUDGE BUCK: Is this not one of the phases

where there seems to be some doubt about the usefulness of the water level because of ambiguities in reading and so on? Is this not the area where the ambiguity is likely to occur?

MR. BAXTER: Yes. And at this point we say in our brief that the Licensing Board misunderstood us. They thought we were saying that the operators could not be trained. What we were saying is the engineers cannot analyze a level to correlate it with particular operator actions and guidance. And I want to make it clear, as we have before in the hearing record, we do not think it is an unworthwhile pursuit t be looking, as the Lessons Learned Task Force recommended, for unambiguous, easy-to-interpret inadequate core cooling. And we are looking at that just as the Staff is. We know now that this is the one that should be installed and it should be done prior to a real study and some thought as to what it is going to be used for and whether or not it can actually detract from safety.

JUDGE BUCK: May I go back to the present instrumentation, saturation meter and thermocouples? My understanding is that the thermocouples themselves are not safety-grade.

And I was wondering, what is the problem with the thermocouples? Do you know the problem that one

might have with thermocouples under these sort of accident conditions? I have not been able to figure out myself exactly what people are worried about in the thermocouples, and yet the emphasis has been made that these are not safety-grade and somehow fail under the accident conditions. And I really do not understand why. And I was wondering if you happen to know what -- maybe your technical people can tell me how they feel about thermocouples.

MR. BAXTER: I know we have 52 of them.

(Counsel confers with Applicant.)

MR. BAXTER: This is Mr. Keaten from GPU Nuclear.

MR. KEATEN: We are sort of in the situation that Ms. Weiss was referring to earlier. The components are assumed to be guilty until proven innocent. That is really the case with the thermocouples. As far as the thermocouples themselves, while we do not have the hard data that would show that they have been qualifed against an environmental qualification program, our actual experience during the TMI-2 accident is that virtually all of the thermocouples exceeded conditions what would be beyond what I would think a normal environmental qualification test would include.

JUDGE BUCK: They went higher than the

recording equipment, went off-scale?

MR. KEATEN: That is correct. The computer program simply stopped analyzing them once they were above 700 degrees Fahrenheit. But when they were read out with the fault meters, they were at one point somewhere registering temperatures as high as 2500 degress Fahrenheit, and they did survive.

As far as the remaining circuitry past the thermocouple back into the control room, that is not environmentally qualified; the connectors, for example, some of the connecting cable, the readout of the thermocouple as it is presently used is not safety-grade. And there is a program under way to upgrade the environmental qualifications or to demonstrate the environmental qualifications of the thermocouples.

JUDGE BUCK: I presume under your schedule now that would come after this present moratorium, shall we say, of equipment evaluation?

MR. KEATEN: I will have to say, Dr. Buck, I am really not sure what the schedule is.

JUDGE BUCK: You do not know how soon it is?

MR. KEATEN: No.

JUDGE BUCK: You do not think it would be before restart or it might be?

MR. KEATEN: My memory is that we are providing an alternate readout of the thermocouples independent of the computer prior to restart. And I honestly do not know about the environmental qualification of the connecting cable.

JUDGE EDLES: Is there any discussion of the survivability of the thermocouples in this case other than -- I am not disputing your analysis.

MR. KEATEN: I believe that the statement that I made about the fact that they had read high temperatures and survived are in the record, although I cannot tell you exactly where.

JUDGE BUCK: That fact, I think, is in the record. But that is why I was concerned about what is it about the thermocouples that we are concerned with here?

MR. KEATEN: I think the real answer from a technical standpoint, it is more the connecting wiring, circuitry, and readout than it is the thermocouple itself.

JUDGE BUCK: And you do not know whether any of that wiring is going to be changed before restart?

MR. KEATEN: No, sir, I do not know.

JUDGE GOTCHY: But you are changing four of those 52 thermocouples to read a wider scale; is that

correct? That would cover a range of temperatures that you might have in an accident?

MR. KEATEN: We have changed the algorithm in the computer for all the thermocouples to read to a much higher scale.

JUDGE GOTCHY: I thought there were four of those thermocouples that had been modified.

MR. KEATEN: I was addressing the in-core thermocouples. I think what you are referring to is the readings on the hot legs, which are safety-grade, and those do have an expanded range readout. That is correct.

JUDGE GOTCHY: I had a couple of questions. I noted in the partial initial decision there was a Footnote 79 which was in the separate comments of Chairman Smith that noted that you had failed to address Staff testimony concerning the usefulness of level indication that the core is uncovered during the TMI-2 type flow blockage condition. Does your failure to respond to that in your findings indicate that you agree with that?

MR. BAXTER: No, sir. It was simply an oversight in the proposed findings. I have pointed out in our brief to you what testimony we had and the reasons why we do not feel that that is of concern.

JUDGE GOTCHY: In Licensee Exhibits 3, 4, and 5, and there is also a draft following transcript page 10663, there is an indication that the rate of recovery of water level is dependent upon several factors, such as break size and location.

Would you agree that, based on the information that you presented, that the water inventory could be significantly reduced but sufficient to provide core cooling for an extended period of time?

(Pause.)

MR. BAXTER: Well, I do not know what you mean by a significant period of time. All of the analyses that have been submitted to the Staff both before and after the TMI-2 accident show adequate core cooling, including those where there is core uncovery for some period.

JUDGE GOTCHY: Some of these, depending upon the break size, are well beyond 2400 seconds, which is a fair amount of time to make a response.

MR. BAXTER: I will ask Mr. Jones to comment.

MR. JONES: It would help if you could just hold up the figure once more. I think I know which one you mean, but just let me take a quick look.

(Pause.)

MR. JONES: The curves that are there are the

mixture, height in the vessel as a function of time for various break sizes. And you are correct in stating that some of those hang up for a fairly long period of time. If you had less HPI, they would still hang up a substantial period of time.

But just like those, you would not be able to tell that you did not have less HPI either because what is happening to you in that early flat portion of the curve is you are at the vent valves and the system is draining down into the vessel and you drop down in level only when you basically empty the entire system, and now you are simply boiling off the inventory remaining in the reactor vessel.

And the effect of less HPI or more HPI for that fact would be just to make any given break from a level response look like some other break. And that again was one of our problems with the level instrument in its ambiguity. It does not help you that much. Once you start dropping off, the drop-off is fairly rapid.

JUDGE GOTCHY: But it would tell you if it was slow to recovering or dropping lower, would it not?

MR. JONES: Yes, it would.

JUDGE GOTCHY: The next question, I guess, is for Mr. Baxter. This gets back into the relationship between design and emergency response again. Would that

kind of information, knowing whether the water level was going up or down, not be useful to an emergency director or an emergency support director?

MR. BAXTER: I am sorry, I thought we had discussed that before. I do not believe that it would be. It seems to me that we have other indications that we are approaching or we are in an inadequate core cooling situation and it is perfectly adequate for the emergency director as it is for the people who are actually operating the plant.

JUDGE GOTCHY: I had one other question on breaks in vessel level instrument tube liners. I do not know if either you or Mr. Jones can answer that. But there was only one mention of it by Dr. Ross. And I did not get out of that any understanding of whether that would represent a small-break LOCA and significant safety hazard or a possible source of improper operator action if you had a water level indicator.

MR. BAXTER: I cannot answer that.

MR. JONES: I do not remember the specific testimony that Dr. Ross gave on that. I would expect that the level instrument would not be very large in diameter, so it would probably not be a small-break LOCA concern and that the probable concern was the loss of pressure that would occur if you were using a pressure

gauge or using typical level instruments where you had a head of water that you were measuring off to the side would give erroneous indications and then effect the operator response.

JUDGE EDLES: We have no further questions, Mr. Baxter.

I would like to conclude with Mr. Trowbridge's observations after lunch, and we can expand your rebuttal time briefly.

MR. CUTCHIN: Could I ask the Board, it appears the Board is interested in having questions in a couple of areas, and I could note to bring those people unless are there other ones that you may want to get into with the Staff?

JUDGE BUCK: I can give you the gamut of questions you might face this afternoon.

MR. CUTCHIN: I was wondering particularly, you have talked about small-break LOCAs and the definitions of inadequate core cooling. I can go so far in those, but if you want the kind of detail you are getting from Licensee --

JUDGE BUCK: I think it would be wise if you had a couple of technical people over here who are fairly broad-based in the situation because I do have a lot of questions.

MR. CUTCHIN: Are there any other areas that you wish to go into?

JUDGE BUCK: Well, I have got a lot of questions on some of Mr. Jensen's testimony, particularly some of the statements that he made in the affidavits in reply to our questions of July 24, the affidavit that Mr. Rotowski put in.

And I think both Dr. Gotchy and I have some questions on water level. We do have some questions similar to what the Applicant and the Intervenors have answered this morning on high-point vents and feed-and-bleed. In other words, we have quite a few questions.

MR. CUTCHIN: I understand, sir. You have identified enough for my purposes. We are bringing someone over to assist the Board.

JUDGE BUCK: I think it would be wise if you did.

MR. BAXTER: I just wanted to see if Mr. Zahler could be excused.

JUDGE EDLES: I think that is true for me.

JUDGE BUCK: I did have one that I looked at a moment ago, and then I went by it.

(Pause.)

JUDGE BUCK: One question I had down here:

how do you test the adequacy of the barrier between the auxiliary building, Unit 1 auxiliary building, and the fuel handling building? What are you proposing?

JUDGE EDLES: Mr. Zahler, identify yourself for the record.

MR. ZAHLER: My name is Robert Zahler. I am an attorney from the law firm of Shaw, Pittman, Potts, and Trowbridge, representing Licensee.

Dr. Buck, I cannot answer that question because, to my knowledge, I do not know what the test program is. I understand that they are developing it, and I believe after lunch, if the program is developed to an appropriate level, we could tell you how we are going to go about testing the barrier.

JUDGE BUCK: The test procedure has not gone to the Staff for an analysis yet?

MR. ZAHLER: That is correct.

JUDGE BUCK: When do you expect to submit it?

MR. ZAHLER: I am told the middle of September.

JUDGE BUCK: Okay.

MR. ZAHLER: Was there anything else?

JUDGE EDLES: I think not. I think we will recess until 2:15.

(Whereupon, at 12:45 p.m., the proceeding was

recessed, to reconvene at 2:15 p.m., this same day.)

AFTERNOON SESSION

(2:15 p.m.)

JUDGE EDLES: Please be seated. Could I ask someone to just please close the door in the rear.

We will begin this afternoon with Mr. Cutchin. You have 60 minutes. I apologize. I was under the impression that you were going to take that up as part of your rebuttal, although I'm prepared to do that now if you like.

MR. PAXTER: It's part of our reply to UCS.

JUDGE EDLES: Okay, go right ahead. I'm sorry, Mr. Trowbridge.

ORAL ARGUMENT ON BEHALF OF LICENSEE,
METROPOLITAN EDISON COMPANY,
BY GEORGE F. TROWBRIDGE

MR. TROWBRIDGE: Mr. Chairman, my name is George F. Trowbridge. I am also a partner in Shaw, Pittman, Potts and Trowbridge.

Let me as a preliminary matter report to Dr. Buck: The closure time on the block valve is 10.9 seconds.

JUDGE BUCK: Okay.

MR. TROWBRIDGE: I am going to spend my time talking about UCS Contention No. 4, that which has to do with the connection of the pressurizer heaters to the

emergency power supply. UCS did not, as I recall, give a discrete discussion of this contention and it was referred to a number of times in rather conclusory terms that we did not have a safety-grade isolation device between the pressurizer heaters and the emergency diesels.

Let me first try to answer a question or implied question from you, Dr. Buck, which has to do with whether the circuitry between the diesels and the pressurizer heaters is safety-grade. The answer is that we have not maintained that the entire circuitry between -- certainly not the cables close to the heaters, which are, among other things, not widely separated -- would be expected to be safety-grade equipment. We haven't maintained -- we maintain now, however, that we do have safety-grade isolation devices between the pressurizer heaters and the emergency diesel main bus, which would intercept any fault in the pressurizer heaters.

This question of the adequacy of our isolation devices has turned out in the hearing to be essentially the only issue on contention 4 between us and UCS. Licensee on this contention presented a technical case. As the Board may be well aware, between the main bus breaker and the pressurizer heater there are two circuit breaker isolation devices, the one closest to the

pressurizer heaters, the distribution breaker, and one between the distribution breaker and the main bus breaker, a main feeder breaker.

We testified, Licensee's witnesses testified, in the proceeding that both circuit breakers were safety-grade, except that the distribution breaker is located in a non-seismically qualified structure. In other respects, it is seismically qualified and the main feed breaker is safety-grade qualified in all respects. The arrangements are that the distribution breaker closest to the pressurizer heaters would trip on an overcurrent caused by a fault. The main feeder breaker would trip on an overcurrent or an undervoltage or an ES signal.

The coordination of the two isolation breakers with the main bus breaker is such that both the distribution breaker and the main feeder breaker would trip at currents very much below the level at which the main bus breaker is set to trip. It would also trip in a time sequence very, very much lower than the time it takes --

JUDGE BUCK: Do you recall the time sequences?

MR. TROWBRIDGE: Approximately .2 seconds for the distribution and the main feeder breaker. The main

bus breaker would trip in a time frame somewhat dependent on the size of the current, but it gets up closer to 15 seconds.

JUDGE BUCK: Okay. So it's a thermal type breaker, probably.

MR. TROWBRIDGE: The Licensee's witnesses, principally Mr. Torsivia, testified that he was confident that the isolation devices would work. He recognized in his testimony that there had been instances of momentary currents which skipped the isolation device, but not in his view with the kind of extreme coordination intervals that are present here.

The UCS witness, Mr. Pollard, did not present concrete evidence to rebut Mr. Torsivia's position. While there was general reference by Mr. Pollard to inadequacies, failures of isolation devices to isolate, he gave no specific examples where the equipment could be matched with the equipment we are talking about or the coordination intervals could be compared with the coordination intervals that we are talking about.

The UCS case was based entirely on a legalistic argument concerning the interpretation of Reg Guide 1.75, which does talk about the isolation devices. The Regulatory Guide 1.75 states that properly coordinated breakers will work. It also says, however,

that as a matter of prudence breakers relying solely on fault current or its effects should not be entirely relied on and there ought to be some other signal, such as an ES signal, which as I have mentioned we already have, for the main feeder breaker. The --

I would correct Ms. Weiss at this point and say, before discussing Reg Guide 1.75, that the Licensing Board did not find that the TMI design violated Regulatory Guide 1.75. Ms. Weiss made the same claim in her brief. We replied to the statement in our reply brief.

What the Board did do was essentially adopt the Staff interpretation of Reg Guide 1.75 and said essentially that we met the Regulatory Guide as interpreted by the Staff. The Staff position was generally that what Reg Guide 1.75 was intended primarily to accomplish was that in the event of a LOCA or other event occasioning the actuation of the ECCS that pressurizer heater loads be discarded and not be reconnected until the diesel had added all of its safety loads and until electrical stability had been accomplished.

JUDGE EDLES: Excuse me. If I may interrupt, I recollect Ms. Weiss, I believe, mentioning that there were other problems other than the mere load on the

diesels that might occur.

MR. TROWBRIDGE: The problem she's talking about, as I understand it, was a fault in the pressurizer heater transmitting itself to the main bus breaker, thus isolating the diesel because of the failure of the isolation devices which UCS claims were not safety-grade and not safety-grade because they don't meet Reg Guide 1.75.

I think it is difficult to read 1.75. I am sure all of us in the proceeding had to read it many, many times. But I think in this case particularly, the Licensee was entirely justified, as was the Board, in accepting the Staff's own interpretation of what the purpose and meaning of Reg Guide 1.75 is. It is, after all, a Reg Guide and not a regulation. It's a Staff product, presumably something the Staff can talk to.

It is, for that matter, a Reg Guide not referred to in the original lessons learned as spelled out in the Commission's order. It was a reference added later on by the Staff, after the August 9 order, to the explanation of its lessons learned requirement.

In any event, Licensee would stand on the technical adequacy of its isolation devices.

JUDGE BUCK: Let me go back to the very beginning, a couple of details. On some reactors the

pressurizer heaters are split into two or more banks, some of which can be turned on at one time or other. Do you happen to know what the situation is with TMI?

MR. TROWBRIDGE: Yes. There are two banks of -- at least two banks that can be connected in this situation, separately routed to two separate diesels and diesel buses. Either can be connected.

JUDGE BUCK: Or both?

MR. TROWBRIDGE: Not both.

JUDGE BUCK: Now, one other point --

MR. TROWBRIDGE: They physically couldn't. The procedures do not call for both; one or the other.

JUDGE BUCK: But if one set is burned out you could turn the other set on?

MR. TROWBRIDGE: Yes.

JUDGE BUCK: Without having a problem with that?

MR. TROWBRIDGE: Yes.

JUDGE BUCK: On the water separation, I understood you to say the wiring does follow the required separation except where it's coming into the heater?

MR. TROWBRIDGE: I would not be able to say. My statement is really the other way around. Where they come into the heater, they do not, as I understand it,

and I cannot trace them back.

JUDGE BUCK: All right. I think I have no further questions.

JUDGE EDLES: Thank you very much, Mr. Trowbridge.

MR. TROWBRIDGE: I may have to be corrected on two things. Just a second.

JUDGE EDLES: All right.

(Pause.)

MR. TROWBRIDGE: I don't think this contradicts what I said, but let me say, there are numbers of like 13 banks. There are two of those banks that could be connected, one to the diesel and one to the other.

JUDGE BUCK: Okay, thank you.

JUDGE EDLES: Mr. Cutchin.

ORAL ARGUMENT ON BEHALF OF THE REGULATORY STAFF

MR. CUTCHIN: Thank you, Mr. Chairman.

As was made clear this morning, UCS has made a number of general assertions that the lessons learned from the TMI-2 accident were not followed at TMI-1, and it claims that the Board was told to review the actions taken that were recommended by the Lessons Learned Group to decide whether they were necessary or sufficient. The Staff thinks that that slightly overstates the

breadth of the mandate given to the Licensing Board, in that there were some specific concerns that were identified by the Commission as the grounds for its immediately effective order.

The Director of Nuclear Reactor Regulation made some specific recommendations for short and long-term actions to address those concerns. The Commission directed the Licensing Board to include among its considerations whether those actions that were recommended by the Director of Nuclear Reactor Regulations were necessary and sufficient to provide reasonable assurance, et cetera.

Intervenors were allowed to come into the hearing and raise contentions of their own, and the Licensing Board, in the absence of any definitive guidance at that time from the Commission as to what kinds of other TMI lessons were proper for consideration in this restart proceeding came up with a scope for the hearing that said that those things that were problems at TMI that could be shown to have a close nexus to the TMI-2 accident could be raised in this proceeding, but that clearly it was not a proceeding at which to really litigate the overall safety of TMI-1.

The only guidance that existed beyond the Commission's order at that point in time was the

November '79 policy statement, which did little more than say that Boards should give consideration to the implications of the accident in interpreting the then-existing regulations, that analyses were at that time going on that may result in major changes to the current regulations and policies having to do with implementation of them, and that thus compliance with the regulations as they existed at that time may not warrant approval of a license application.

Now, admittedly this guidance was directed toward consideration of new operating licenses. But I think by analogy it is obvious that the Commission has rarely imposed greater requirements on older reactors than it has on those seeking new operating licenses.

Between the time that UCS' contentions were ruled on by the Licensing Board in September of '79 and the time that the evidentiary hearing on those admitted to litigation on November 4th, 1980, the Commission had issued an additional policy statement providing, among other things, guidance, additional guidance to adjudicatory boards for considering the TMI-2 accident-related issues and proceedings for applications for new operating licenses.

At that time the Commission indicated that the list of TMI-related requirements in NUREG-0694 should be

considered adequate for responding to the accident and directed that current operating license applications were to be measured against the regulations as augmented by the requirements of NUREG-0694. The Commission allowed challenges to both the necessity and sufficiency of those requirements that interpreted, refined, or quantified the general language of the regulations, meaning whether they were complied with.

However, the Commission at that time forbade challenges to the sufficiency of those requirements that served to supplement the regulations by imposing additional requirements. The Commission in fact said that many of the decisions to impose requirements involved more policy considerations than law and factual considerations.

Shortly after the Licensing Board began hearing evidence on UCS' contentions, the Commission again revised its guidance in another revision to that original statement of policy and noted that NUREG-0737 had superseded NUREG-0694 as the document setting forth those of the various actions recommended by the several groups studying the accident and that those actions that had been recommended were adjudged by the Commission to be an appropriate basis for responding to the lessons learned from TMI-2.

The Commission also noted that on reflection it had decided that most of the actions set forth in NUREG-0737 were the result of interpretation rather than supplementation of existing regulations, and indicated the challenges to the necessity and sufficiency of both types of requirements, those interpreting and those supplementing, were to be allowed.

Stay later, and after almost all the evidence on plant design issues had been heard in the proceeding, the Commission issued still further guidance on litigation of TMI-related issues in licensing proceedings. That guidance came forth in Diablo Canyon, in CLI-75.

In that guidance, the Commission indicated that under its latest revised statement of policy a party seeking to challenge whether there is sufficient protection to the public, despite compliance with all applicable regulations, had only two procedural options available to it:

First, the party could challenge the sufficiency of an item in the NUREG requirements. However, the scope of the inquiry under that option was limited to the particular safety concerns which prompted the specific requirements in the NUREG document. The party must focus on the same safety concern that formed

the basis for the NUREG requirement and litigate the issue of whether the NUREG requirement is a sufficient response to that specific safety concern.

The Commission made clear, perhaps for the first time, in CLI-81-75 that where there is compliance with all applicable regulations to deal with the safety concern that was not specifically considered in NUREG-0737.

Now, of course the Staff recognizes that by that point in time the hearing was essentially over, and indeed some of the evidence that has been admitted in this proceeding appears to have gone well beyond that guidance, and there is not much that can be done about it, the point being that such contentions, according to the guidance, could be dealt with in accordance with 2758 and only the Commission could decide whether they would be heard.

Thus I think UCS bears a heavy burden where it's seeking to require actions that are not required by the regulations as interpreted by NUREG-0737. The Staff believes that for the Appeal Board to find that the Licensing Board committed error harmful to UCS in deciding issues related to UCS contentions on their merits and that are also subject to the UCS appeal, the Appeal Board must find that UCS has demonstrated that

the record of the proceeding shows that the Licensee's actions in response to safety problems alleged by UCS to exist will not comply with the Commission's current regulations as interpreted, refined or quantified by NUREG-0737 for operating reactors, or that an action required by NUREG-0737 for operating reactors in response to that particular safety concern which prompted the requirement is not sufficient and that the Licensing Board could not have properly found to the contrary.

Moreover, the Staff believes that under the procedures established by the Commission for challenging the sufficiency of actions required by the regulations as augmented by NUREG-0737, UCS as the proponent of the additional requirements bears the burden of demonstrating by prima facie evidence of record, not by mere argument or the posing of questions, that the additional requirements are necessary; and that to determine whether these requirements are necessary the standard set forth by the Staff, rather than that set forth by the Licensing Board or UCS, is the appropriate standard to be used.

The Staff believes the standards is a legal one, not a technical one, even though technical judgment is required in order to determine whether the standard

is met. The Staff believed at the time of the hearing, and it does now, that the standard was characterized, intentionally or otherwise, by the Commission in 79-8 to say that necessary requirements are those without which -- or necessary actions are those without which a Board could not make a finding of reasonable assurance that the plant could be safely operated.

The Licensing Board defined the standard as actions providing substantial and additional protection if, based on the record, they are reasonable in view of the technology, resources and risk. UCS appears to have defined the standard as requiring an action that provides substantial protection for the public health and safety without consideration of feasibility.

To the extent that a necessary action is viewed to include a determination of feasibility, the Staff, as it indicated in its brief, would have to agree with UCS. However, there is no evidence in the record that the Licensing Board employed the feasibility portion of its standard to reject any UCS proposal for additional action at TMI-1.

UCS would not prevail, regardless of whether the standards applied were those espoused by the Licensing Board, by UCS or by the Staff, in the Staff's view. UCS has failed to demonstrate either that actions

to be taken by the Licensee are not in compliance with the regulations, with the one exception, arguably, of UCS Board Question 12 on environmental qualification, and I will address that, if given the opportunity to, shortly, and I'm sure I will be -- or that actions proposed by UCS would provide additional protection to the health and safety of the public.

Nor does the record in this proceeding support a finding that additional actions proposed by UCS are necessary, regardless of the standard applied. UCS, contrary to its assertion, has not been denied due process, either. UCS has been given the opportunity to present its case, to be heard. However, a determination by the Appeal Board of the correct standard for deciding necessary and sufficient actions has become important where the Staff is not aware that the standard has been challenged previously.

In this instance, UCS first and now the Licensee have both challenged the Licensing Board's definition. And as I say, I am unaware that it has been challenged previously. Until challenges were allowed to the sufficiency of actions despite their compliance with the regulations, as supplemented now by NUREG-0737, there has been no reason, in the Staff's view, to distinguish between actions that are necessary and those

that may be desirable but not necessary. Now the sufficiency of certain actions, those set forth in NUREG-0737, can be challenged despite the fact that the regulations as augmented by that document are complied with.

Therefore, the distinction becomes important. Imposition of necessary actions, meaning those without which there cannot be a finding of reasonable assurance, are mandatory, and to that extent the Staff would agree with UCS again. But imposition of desirable actions has an element -- they have an element of discretion in them.

Admittedly, the Commission must find a safety basis --

JUDGE BUCK: Whose discretion?

MR. CUTCHIN: I think it's the Commission's discretion ultimately. A decision by the Appeal Board may become dispositive of questions regarding the proper standard for determining whether actions in addition to those set forth in the regulations as interpreted in NUREG-0737 are necessary, in other words whether the totality of actions taken was sufficient. And if the Appeal Board does not decide that consideration of the feasibility of actions is not proper in connection with determining whether an action is truly necessary, as

that term is used by the Staff, it could create a problem.

The Commission may require, as I indicated, more of the Licensee than will provide adequate protection, but it may not require less. And of course the decision in PRDC that was cited in Maine Yankee indicated that the adequate protection standard of the Act was found to be equivalent to that in PDRC of providing reasonable assurance to the health and safety of the public.

If the Appeal Board finds in Licensee's favor using the Board's standard which encompasses under the rubric necessary both necessary and desirable but not necessary actions, that finding would perhaps then have to be overturned by the Commission in order to require insulation by the Licensee to detect adequate core cooling. Of course, if you found in Staff's favor using the definition, it would matter none.

If the Appeal Board decides against UCS without making clear that consideration of the feasibility of actions proposed by it did not affect the outcome, that, too, could create problems on appeal. So for that reason I think the definition where it had not made much difference before has now assumed some importance in this proceeding. But for the challenge to the standard it would not have.

I would now like to address myself to a few of

the comments made by UCS this morning. I would go first to the charge that the staff "blackmailed," if you will, the Licensing Board into taking the position that it did in connection with environmental qualification.

As we pointed out in our brief, UCS had originally filed and had admitted to the proceeding under the guidance then available to the Licensing Board a contention which challenged Licensee's demonstration of compliance with general design criteria -- general design criterion as defined by Reg Guide 1.89 or equivalent. Then UCS later withdrew that contention and litigated the issue to the extent that they did on the coattails of the adoption of that contention by the Licensing Board. And it's Staff's view that once the Intervenor has withdrawn its original contention, regardless of what it thought the scope of that contention was, once the issue has been picked up sua sponte, if you will, by the Licensing Board, the scope of that issue is no broader than the Licensing Board viewed it to be. And of course the Staff agrees that the Appeal Board has the same sort of authority to raise those kinds of issues.

The Licensing Board made clear, I believe, in its decision that its primary concern originally was with the radiation levels to which instrumentation had

been exposed. They later also expressed an interest in whether the instrumentation and equipment was environmentally qualified for the submergence levels that would be reached following an accident that released water into the reactor building.

With the conditions that the Licensing Board imposed at the behest of the Commonwealth of Pennsylvania in response to the submergence questions, the Licensing Board decided that if those were dealt with as the Staff was directed to deal with them, that would take care of the concerns about the submergence issues.

They were, and the Staff freely admits, somewhat frustrated by the Staff's failure to come forward with the extent of information that the Board would like to have had available to it to address the matters of radiation qualification. I think it was perfectly appropriate since at that point in time the Commission was to have been the reviewing arm to let the Commission decide and have the Staff report to the Commission for resolution.

I think events have overtaken even that situation in the last year-plus, and, as we have indicated in our response to some of the Appeal Board's questions, we think that the interim rule has overtaken

everything and that that is controlling, and that, therefore, matters related to environmental qualification, which, by the way, in the view of the Staff had to do not with a finding that equipment was not qualified but that there was not sufficient paper to demonstrate that it was qualified. And the requirement was to come up with a demonstration, and where equipment was found not to be qualified, to qualify it and to replace any such equipment in a plant with equipment that was qualified.

JUDGE BUCK: Are you telling me now that the question of submersion of equipment is no longer permissible in this hearing?

MR. CUTCHIN: No, sir. If this Board were to find that the conditions imposed by the Licensing Board if complied with would not be sufficient to take care of those concerns, I would believe I would have to say that the Board could inquire into it.

JUDGE BUCK: Well, the condition they put on was for the Staff to review it.

MR. CUTCHIN: I believe it was for the Staff to avail itself of the information and then do an in-depth review rather than to accept what the Licensee advanced as the appropriate level for placement; and they gave two alternatives, if I recollect. If one set

of events occurred and all of the instrumentation could be raised above the appropriate level, that would satisfy things; and then there was another alternative.

JUDGE BUCK: And -- well, that's not a condition as far as I'm concerned. That's just leaving it up to the Staff.

MR. CUTCHIN: That's one view that could be taken, yes, sir, but that is the normal situation. That particular challenge was not mounted at the time, if I recollect, by UCS. That was not a UCS concern.

JUDGE BUCK: My concern is this is an environmental condition. At least I view it as such.

MR. CUTCHIN: I view it as an environmental condition as well.

JUDGE BUCK: Yet you're saying -- I shouldn't be arguing this. I should let the lawyer argue this. But you're saying the Commission has taken over or stopped the review of the environmental condition until some time after March or whenever it is the Commission comes down with its view. And yet you are telling us that the one concerning the submersion is supposed to go right ahead.

Now, what's the difference?

MR. CUTCHIN: I guess I don't really see a difference, Dr. Buck, but I think if the matter is

before you, you can either follow the Staff's suggestion, which was to decide that the rulemaking governs -- and I think that is a fair interpretation -- or you can go ahead and do as you will, and the Commission will ultimately decide.

JUDGE BUCK: But, in essence, the old rule of unanswered safety questions no longer applies in this particular case where the Licensee and the Staff are to present a description of the ways in which they think this reactor satisfied the unanswered generic problem. I mean that is wiped out in this particular case, is that correct, if one looks at this as being an unanswered safety problem in this case?

MR. CUTCHIN: One of the lists of so-called unresolved safety issues.

JUDGE BUCK: Yes.

MR. CUTCHIN: I believe that the Commission's rulemaking was partially in response to item A.17. I'm getting over my head now on which particular item it was.

JUDGE BUCK: A.27 or A.17 or A.24.

MR. CUTCHIN: Yes. As to whether they got to litigate these things or not, and they did get to litigate it to the extent that the Board found appropriate, and but for the fact that the rulemaking has overtaken, in our view -- and that's a position we

espoused in our latest response on a question to the Board.

I think the Board appropriately could leave the matter lay there for resolution generically.

JUDGE EDLES: Let me see if I can pick up on Dr. Buck's question. It is one I had also asked Ms. Weiss.

How can we then assure ourselves that the plant is safe for restart if we have this particular issue that is unresolved? Maybe I would ask you to help me out now, teach me. What are the two lines of cases, at least as I understand them, and how do you reconcile them?

MR. CUTCHIN: I believe, sir, that with respect to the particular language in the statement of considerations for the rulemaking on the interim rule, it can be read, as we indicated in our response, to say that the Commission has determined that there would be no undue risk to the health and safety of the public to allow plants to continue to operate in the interim pending completion of the demonstration of qualification of safety equipment.

In that case I think it would be a perfectly appropriate thing for this Board to say that the rulemaking governs, and that's the position we took.

But, of course, the Board is free to disagree if they find a valid basis for doing so, in which case they would proceed onward.

JUDGE EDLES: Give me the arguments for taking the second course. I appreciate it's not your suggestion.

MR. CUTCHIN: Well, on your view as you espoused in response to Licensee's views as to the scope of your review authority, I think that you could decide that you had a right and maybe responsibility to review the entire record below on its merits. But I happen to think the second or first argument is a better one.

JUDGE EDLES: I appreciate that.

MR. CUTCHIN: That is really the extent of the comments that I had intended to make, except to try to respond to questions the Board may have.

JUDGE EDLES: Let me ask you if you would run through for me since I'm not very clear on it where the Staff now comes out in terms of the UCS contention regarding the consideration of Class 9 accidents.

MR. CUTCHIN: With respect to the NEPA questions?

JUDGE EDLES: Right.

MR. CUTCHIN: The Staff's position is that the purpose of this hearing originally was to consider

whether the responses to the TMI accident were sufficient to move that particular scenario back into the realm of the incredible.

The Board in the order appealed from by UCS also indicated that various other scenarios were reviewed by it and by the Staff and determined that those with a nexus to the TMI accident were also found to be incredible.

The Staff does not believe that the Commission's policy statement on when an EIS must address the environmental impacts of Class 9 accidents would indicate that such is required in this case. Clearly there was an FES prepared originally. An environmental impact assessment was made eventually in connection with the restart, and there were found to be no impacts of significance which would warrant the preparation of a new EIS. And I think the fact that the Commission is having Class 9 impacts addressed in final environmental statements at all is a matter of Commission policy and choice rather than a requirement of the law as it was previously interpreted. Because by definition if Class 9s are incredible, they do not have a reasonable likelihood of occurrence, and NEPA does not require you to address those -- the impacts of those things which do not have a reasonable likelihood of

occurrence.

JUDGE EDLES: But in large measure the underpinning for that determination has now been eroded.

MR. CUTCHIN: One could view it that way.

JUDGE EDLES: The Commission has said in circumstances where there are unusual circumstances affecting a particular license application.

MR. CUTCHIN: And none of those were found to apply in this case.

JUDGE EDLES: That's a point. I guess what I'm trying to get at, are we foreclosed by the nexus requirement from looking at NEPA issues even if we determine contrary to your view that there are indeed circumstances affecting TMI?

MR. CUTCHIN: Of what type?

JUDGE EDLES: I, for example, in the Commission's instituting order back in August of '79, they tick off a whole host of things by way of explaining why they're instituting a restart proceeding. They talk about the features of the B&W design, but they then go on to say in addition to the items identified for the other B&W reactors -- these are the Commission's words now -- the unique circumstances at TMI require that additional safety concerns identified by the NRC Staff be resolved prior to

restart. They mention what they are, things like the potential interaction between Unit 1 and Unit 2, management capability issues, emergency plan concerns.

Now, I realize that most of this case will indeed resolve one way or another a whole host of things, but my question is in light of the Commission's 1979 statement that there are unique circumstances at TMI that require examination, how am I to conclude that there are indeed no unique circumstances at TMI?

MR. CUTCHIN: I think there are unique circumstances to find that they would have an environmental impact. I think you would have to find there are unique circumstances which would significantly affect the environment, because I believe that was the underpinning in those situations like offshore power where it involved potentially serious consequences associated with liquid pathways, et cetera.

But I think if the finding is made here that the Class 9 type scenarios that have been postulated are not credible, then there is no likelihood of their occurrence, officially occurring.

JUDGE EDLES: That comes back to my earlier question. Those Class 9 scenarios that were litigated, as I understand it -- correct me if I am wrong -- were those that only had a nexus to TMI.

MR. CUTCHIN: I believe the nexus requirement --

JUDGE BUCK: No.

MR. CUTCHIN: I would certainly believe that the scope of the NEPA review needn't be any broader than the scope of the safety review, and that is limited by the nexus to the TMI requirement.

JUDGE EDLES: Although presumably there was no expressed nexus requirement in the Commission's policy statement.

Now, what I'm trying to do is how do I read those two together is what I'm saying.

MR. CUTCHIN: I believe the better reading of the Commission's policy statement is as we set forth in our argument; that is, that of course the Licensing Board went on to say that they weren't sure whether it applied or not, and what was the situation if it did not.

JUDGE EDLES: But they didn't say what the situation would be if it did apply. That's one of the problems I do have.

MR. CUTCHIN: Then they went ahead to address the kinds of things that could be considered and decided that an EIS was not necessary, in their view.

JUDGE EDLES: And presumably we now have the obligation to review their determination that an EIS is

not necessary.

MR. CUTCHIN: Well, I believe one could also focus on the Commission's statement that the change in policy wasn't to be construed as a basis for reopening or expanding any proceeding. And if you have to expand the scope of the proceeding to look at circumstances beyond those that were considered in the safety hearing, I think one could read the language there, if one doesn't believe the policy statement, prohibts or says there is a non-need to address Class 9 accidents.

Again, I think it is a policy decision. The Commission said as a matter of policy that they were going to have included in certain kinds of environmental impact statements that were to be done in the future an assessment of Class 9 accidents. But they clearly also said that that was not to be a requirement in those situations where a full-blown EIS final environmental statement had already been issued.

And I think unless one finds that there are valid reasons for preparing an EIS other than in connection with that particular consideration, there is clearly no requirement that there be an EIS prepared in connection with the restart. There has to be some finding that there are significant impacts arising out of the restart that were not previously focused on.

JUDGE EDLES: One final question on that. How does the TMI population density differ from that which the Commission has already concluded in at least one proceeding, the Perryman case, that it would look at Class 9 accidents?

Where do I come out in this case vis-a-vis Perryman? I agree with you that the other kinds of cases, the offshore cases, are kind of design problems; but Perryman, as I recall, was one which didn't involve a specific design problem but a potential impact on the population, which is roughly analogous to what we have here, although you're welcome now to explain why it isn't analogous.

MR. CUTCHIN: The problem I have, Mr. Chairman, is that if we were looking at an initial licensing proceeding from scratch, that might -- in fact, under the Commission's policy that would be an appropriate consideration for deciding. But in a situation like this where there is no other "hook," if you will, to hang the requirement for an environmental impact statement on, I don't think you get to that question, because there were projections of population made at the time of the original FES, and the impacts of both construction and operation of the plant were examined. And in accordance with my view at least of

the Commission's policy, there is no requirement under that policy statement.

JUDGE EDLES: What about the fact that the court, and now presumably the Commission, has concluded that we have a somewhat more traumatized population at this point than we had back when the original EIS was done? Do I take that into account?

MR. CUTCHIN: I would think the more appropriate view, since you press me, Mr. Chairman, is that if there's any doubt in its mind that before it independently directed that an environmental assessment considering these matters be prepared, that perhaps that would be an appropriate question to bounce off the Commission.

JUDGE BUCK: I think actually that the question of the Class 9 accident didn't come up in connection with TMI-2 as a result of the application of the offshore plants. That's where the whole thing got reviewed again, because up until that time it was looked at as a broad thing. And then in the review we decided well, land is one thing, the sea is another.

MR. CUTCHIN: I agree. I don't think this preceded TMI.

JUDGE BUCK: And I guess the review came along at approximately the same time.

MR. CUTCHIN: I don't think it had any connection with TMI-2.

JUDGE EDLES: I have no problem with that, and if the Commission had limited its consideration to offshore facilities, I would feel quite comfortable with that. The problem is they have not done so.

MR. CUTCHIN: However, it has not yet even been decided, to my knowledge, that in response to the Court of Appeals direction to examine the question that the decision has been made that there is a significant enough impact to go forward.

JUDGE EDLES: I think you're correct on that.

JUDGE BUCK: Are you through with your prepared remarks?

MR. CUTCHIN: I'm through with my prepared remarks and now I'll field as many questions as I can.

JUDGE BUCK: First of all, one of them got answered this morning. That is about the ventilation system separation. The Staff has not yet gotten the report from the Licensee?

MR. CUTCHIN: No.

JUDGE BUCK: Is this a requirement for restart? I believe it is.

MR. CUTCHIN: It is subject to the license condition, if I recollect.

MR. JACOBS: It is a requirement.

JUDGE BUCK: There was some testimony that the Staff was still investigating the Licensee's flood calculations. Has that matter been decided yet? Have you reviewed the Licensee's calculations?

MR. CUTCHIN: I'm not sure I've gotten a response to our letter. We put out a set of questions after the initial response and I believe we included in the response to the Board's questions a copy of both that and the other.

MR. JACOBS: I've been out for a week and a half. To my knowledge we haven't received the response

yet.

MR. CUTCHIN: The Licensee may be able to tell us if he's filed it.

JUDGE BUCK: Mr. Rostowski's affidavid concerned the keeping of the cold shutdown, and it appears that SECY 82-207 leaves the problem of cold shutdown or need for cold shutdown procedure and so on, and the environmental requirements for cold shutdown, again up to the Commission, or apparently it does so.

MR. CUTCHIN: That's my understanding, sir. I maybe jumped in too soon.

JUDGE BUCK: Go ahead.

MR. CUTCHIN: It's my understanding the Commission directed the Staff to prepare the latest version of the rule to include cold shutdown as an option, and until they make a decision it will not be clear whether it is in or out. However, in connection with the formulation of that modification to the rule the Staff indicated that their contractor had, based on a review, made certain determinations as was set forth in the affidavit.

JUDGE BUCK: That's the part that bothers me. Let me read you what the Staff says here: "The Staff has also noted there is a general agreement with the conclusions of this contractor, the Franklin Research

Institute. The contractor, based on a brief review of the information submitted for the eleven plants, concluded the information indicates that to achieve cold shutdown little if any equipment beyond that needed to achieve hot shutdown is required; that a large percentage of the equipment needed to achieve cold shutdown is the same type already required to be qualified for hot shutdown; and that another large percentage of the equipment needed to achieve cold shutdown is located in a mild rather than a harsh environment."

Well, two majorities don't make a whole, is my problem here. If you take this thing, you can say the majority is 51 percent in both cases; you're still left with about 24 percent of this equipment that they don't know about. I find this sort of a ridiculous statement to put in here, and if that's what the contractor said I would be tempted to get another contractor. But we don't have the contractor report. We've got only the affidavit here.

I find it just rather amazing that a statement like this would be put in here as proof of the fact that you don't need any more environmental qualification of the rest of the equipment. Whatever that may be, I don't know.

MR. CUTCHIN: Well, we're left with the situation, Dr. Buck, as you may realize, that for the class of plants of which TMI-1 is a member, the older vintage plants, the Staff was viewing hot shutdown as safe shutdown. Now the Commission is taking into consideration whether nevertheless to go ahead and require that the equipment needed to go cold shutdown be backfit, if you will, to that old class of plants.

JUDGE BUCK: I recognize that, but I think this sort of an answer, you know, really doesn't do anybody any good.

MR. CUTCHIN: That was the best information they had and we were giving you what we had, and that was all we had.

JUDGE BUCK: I realize that, but it doesn't make me very happy to have that.

MR. CUTCHIN: I realize that too, sir.

JUDGE BUCK: You'll have to give me a minute here to see how many of these questions have been answered.

(Pause.)

JUDGE BUCK: Mr. Jensen, in answer to 2.D of our questions -- and I'll have to look up my index; unfortunately, he did it by affidavit and not by question.

MR. CUTCHIN: In our response, Jacobs affidavit was first and Jenkins followed.

JUDGE BUCK: Can you tell me where it is?

MR. CUTCHIN: It's on page 10 of Jensen's affidavit.

JUDGE BUCK: Well, in this affidavit Mr. Jensen was talking about the small break analysis and he says that the NRC has had numerous meetings with B&W and so on and they have concerns about the interruption of natural circulation, thermal shock, and so on and so forth. And he says that they are -- the Staff is planning to work with the Licensee and obtain data from the GERTA facility and so on.

The Applicant has objected to that in some respects as being an overstatement of what they have agreed to do. My main question, however, is where do we stand on the models for the small break analysis and how well qualified does the Staff presently feel they are?

MR. CUTCHIN: The position we took in the hearing -- and I understand there is no basis for changing that on the short-term view -- is that the models as they were used to support the licensing of the plants, we have no reason to change our opinion as to whether they comply with 50.46.

But with respect to longer-term concerns --

JUDGE BUCK: You mean they do as far as you're concerned comply with 50.46?

MR. CUTCHIN: That was the position taken in the hearing and I'm unaware that that's been changed. I could confirm that by turning around and asking, but --

JUDGE BUCK: You may turn around, sir.

MR. CUTCHIN: That is still our position.

JUDGE BUCK: Then what are you still seeking?

MR. CUTCHIN: Some model confirmation in terms of, I believe, experimental data. But if you're going much further than that -- and one more detail I happen to have available. Mr. Jensen --

JUDGE BUCK: What I'm trying to find out is, how do you find this satisfactory for short-term if you don't have reasonable model confirmation already? In other words, what more are you seeking from these people? Is it decimal points or is there something that you are basically afraid of?

MR. CUTCHIN: I'm not sure it's the latter, but I think you've carried me to the extent of my knowledge, and perhaps now I can call on either Mr. Jensen or -- who wants to volunteer?

(Laughter.)

JUDGE BUCK: It looks like a slow volunteer.

MR. CUTCHIN: He's the one that prepared the

affidavit, who is the most qualified to answer it. I think the Board wants the best answer.

JUDGE BUCK: I want the person most qualified to answer.

MR. SHARON: My name is Brian Sharon. I'm Chief of the Reactor Systems Branch.

The reason we are requesting the confirmatory experimental data is basically one that we have looked at the models, we do believe that we find the plant in continued conformance with the Regulations 50.46 and Appendix K.

JUDGE BUCK: Excuse me. Do you have any problems with the models themselves? Do you think they're satisfactory? Do they need correcting or anything of that nature?

MR. SHARON: We've looked at the models, we've looked at the verification that has been provided to date by the Licensees, and based on that information provided we have sufficient assurance that the plant can be operated safely. However, there is longer-term confirmation that we believe is needed in order to, as I would say, confirm this assurance that we have right now.

JUDGE BUCK: Can you give me an example of the type of thing you're looking for?

MR. SHARON: For example, under a small break situation, a bleed from a break size less than one inch, the B&W reactor has been calculated to collect a steam bubble at the top of the hot leg candy canes that would interrupt the natural circulation.

JUDGE BUCK: Right.

MR. SHARON: The analyses and the physics of the process indicate that core uncovery would not occur prior to re-establishment of natural circulation and a heat sink, thereby allowing the plant to depressurize and to allow the safety systems, the high pressure injection systems, to restore the inventory such that no unacceptable core uncovery or heatup would occur.

JUDGE BUCK: This would be because of the establishment of natural circulation or what?

MR. SHARON: Yes. When you interrupt natural circulation you remove the heat sink from the heat source.

JUDGE BUCK: Right.

MR. SHARON: Therefore the system pressure starts to increase.

JUDGE BUCK: Yes.

MR. SHARON: As it increases, two things happen. One is that the leak flow or the break flow increases as the pressure increases.

JUDGE BUCK: Yes.

MR. SHARON: The second is that the safety injection flow, which is attempting to restore the lost inventory, is decreasing.

JUDGE BUCK: Yes.

MR. SHARON: If the situation remains, one would eventually lose more inventory than one could make up and you might predict an unacceptable core uncovery. Right now the calculations show that, even though you interrupt natural circulation and you do see an initial repressurization, the draining of the system due to leak flow will eventually uncover the condensing surface in the steam generator.

This condensing surface is above the level, the top of the core. Once you uncover a condensing surface, the steam being generated in the core can now be condensed by the steam generator. Okay, once that occurs you re-establish what we call the boiler condenser mode of natural circulation.

JUDGE BUCK: Okay, okay.

MR. SHARON: You depressurize the plant at that point. The pressure comes down because you're removing heat and the safety injection flow increases. The break flow decreases and inventory is restored at a greater rate than it's being lost.

JUDGE BUCK: This is all on the assumption that the HPI flow in is sufficient to overcome or at least is supplying enough fluid --

MR. SHARON: Correct.

JUDGE BUCK: -- to take the heat out.

MR. SHARON: What we do not have confirmation of is the process of trapping the steam bubble at the top of the candy canes or the inverted U-bends. The draining process and the re-establishment of natural circulation, okay, this has not been demonstrated experimentally.

Additional concerns are with the long-term recovery of the plant.

JUDGE BUCK: Because you tend to stay at high --

MR. SHARON: As you recover the plant, the same process occurs in reverse. As you refill the plant, you cover the condensing surface. You now have a steam bubble trapped up there. The plant could repressurize again. As it repressurizes, the same process might occur over again. You would repressurize until the leak flow exceeded the safety injection flow. The plant would drain down, uncover a condensing surface, depressurize a second time, and you could get a long-term oscillatory behavior in the pressure, which

the operator would perhaps not be able to control sufficiently or perhaps not recognize in terms of what was occurring and be assured that the operator would take the correct action.

JUDGE BUCK: Okay. Let's suppose that your models are not correct and you don't get to this circulation buildup with the pressure. Does this mean you have to have more high pressure injection or some such thing as this, or how do you overcome that?

MR. SHARON: I think the concern is not one of where you eventually remove decay heat. I kind of look at the system as a cat that always falls on its feet. It tends to equilibrate.

JUDGE BUCK: As long as you have enough mass going into the core. I presume you will eventually begin to cool.

MR. SHARON: Yes. The question or the concern we have is that as the system begins to repressurize, for example, an operator could interpret that as a loss of his heat sink for some reason, a loss of feedwater, even though he may have indications --

JUDGE BUCK: In a sense it is that?

MR. SHARON: Yes. And now one can envision the operator could interpret his symptoms in a wrong way and take an incorrect action, or not perhaps an

incorrect but an action that could aggravate the accident, perhaps worsen it.

We have been assured by B&W that the abnormal transient operator guidelines, ATOG, account for these. However, those guidelines are not based on any experimental data that is confirmed in model predictions.

JUDGE BUCK: Well, is there any -- as I recall the B&W reactors, there is a chance of circulation within the core itself, is there not? If you're shoving cold water in, can you get natural circulation around the core, or are there vents?

MR. SHARON: I think the circulation you're referring to is that which was calculated by Los Alamos, where they had voided the hot leg candy cane and yet were able to remove decay heat by internal circulation where the water was heated in the core, circulates out through the vent valves, and mixed with the incoming cold ECC water, and re-entered the core.

JUDGE BUCK: Right.

MR. SHARON: And I think in a memorandum which we wrote -- I'm not sure, I think the Board has seen it -- we explained that this mode of decay heat removal was nothing -- it was not one that was not expected, okay. It is the unique combination of break size, HPI flow

capacity, pump capacity, number of pumps available, and a host of other conditions that would determine which mode of decay heat removal.

JUDGE BUCK: I'm changing questions a little now. If I recall, you do have to have two HPI pumps running if it is a -- well, a real small break situation, in order to get enough mass into the core at high pressures, is that correct?

MR. SHARON: No. The plant is designed to the single failure criterion which is specified in Appendix K, and typically the single failure assumed is the loss of an ECC system, including one HPI pump. So the plant is designed to comply with the regulations for the entire spectrum of break sizes, assuming one HPI pump is not available.

JUDGE BUCK: You have two HPI's?

MR. SHARON: Two HPI pumps.

JUDGE BUCK: Just two?

MR. CUTCHIN: I believe on Three Mile Island there are three.

JUDGE BUCK: A turbine-driven pump or something? I may be wrong.

MR. SHARON: That's the emergency feedwater.

JUDGE BUCK: What would be the benefit if one had vent valves on a candy cane? Does this help the

situation?

MR. SHARON: I believe you mean high point vents?

JUDGE BUCK: Yes.

MR. SHARON: It is not clear how this would help. We ran a preliminary calculation at Los Alamos where we investigated various means of trying to restore natural circulation when the plant was in an interrupted natural circulation mode. We looked at bumping the reactor coolant pumps, opening the high point vents and depressurizing the secondary side of the steam generators.

All three of those actions, at least according to the calculations, were -- showed that these actions would not promote natural circulation once the candy cane was in a voided condition.

I think Mr. Jensen had explained that there was a range of what we call system void fractions or steam volume content in which one would expect this interaction to occur. Okay, simply put, the system doesn't have enough water in it to circulate.

JUDGE BUCK: Well, I'm trying to -- I don't know whether you've answered the question as to whether or not the high point vents would help.

MR. SHARON: I think that the calculations

indicate that they would not help. We have not pursued it in any detail. This would be one -- I believe I guess one option that we would certainly encourage in some sort of a test, experimental test program. This would be to look at various means or methods for perhaps trying to induce natural circulation and help restore it if it was interrupted, although, as I've said, the interruption itself is not going to lead directly to an unacceptable situation.

JUDGE BUCK: So the situation is, if I may summarize what I think you've said now, that you're in is that your analytical models show that you can get circulation using the HPI pump and whatever else is necessary as far as feed and bleed, shall we say, and from there you can get to natural circulation, but that you have not tested these models experimentally.

MR. SHARON: The models have been compared against what we call separate effects tests. For example, a -- one of the key parameters perhaps is the rate at which bubbles will rise in the vertical hot leg section, which in turn determines how fast steam will accumulate at the top of the candy cane. The buble rise model --

JUDGE BUCK: Have these done at temperatures and pressures equivalent to the reactor?

MR. SHARON: I am not sure if the conditions under which the separate effects tests were performed were exactly at the temperature and pressure conditions. But there were tests, there are test data available. I believe there are some models available called Wilson bubble rise, as an example, in which the vendor or the Licensee has provided information on the acceptability of their model against the separate effects parts. But they have not provided any experimental data demonstrating that you can take all of these separate model pieces and put them together and predict an entirely integral system type of behavior on an experimental facility that is representative of the B&W configuration.

JUDGE BUCK: Your expectation now is that that will be done?

MR. SHARON: We are not sure right now. Right now I would say we do not have the confidence I think we would like to have regarding that this experimental data will be obtained through some sort of a cooperative industry-government program.

JUDGE BUCK: Is it a cost situation or what?

MR. SHARON: I think there appears to be a misunderstanding regarding an agreement, the agreements of a meeting that was held in Bethesda on July 20th.

JUDGE BUCK: I think that came out very clearly in the correspondence we received. I'm not going to try to judge who's right from that correspondence.

MR. SHARON: Right now we are in receipt of one letter from the B&W owners of the various licensees. I guess to summarize this letter, as I understand it they are proposing that the GERTA test facility in Alliance, Ohio, that they would obtain data from this facility that is presently going to be performed for the German government, I believe, or German industry.

They would purchase this data, submit it to the Staff for review. They would also plan to evaluate this data and at that time determine if, as an example, if the GERTA facility was providing sufficient data or

whether they concluded that upgrading of that facility or perhaps a new experimental facility should be constructed, for example, another SEMI-SCALE.

JUDGE BUCK: They already have the SEMI-SCALE, a SEMI-SCALE.

MR. SHARON: We have a SEMI-SCALE facility in Idaho National Engineering Lab. That facility was modeled after a typical Westinghouse four-loop reactor. The primary system piping does not look like a B&W primary system.

JUDGE BUCK: It was my understanding this morning that the Alliance research facility was building or had built a SEMI-SCALE fitting the B&W plants, is that correct, or is that just a proposal?

MR. SHARON: Yes, there is a facility up there. I personally toured the facility. The facility is approximately the same scale as our Westinghouse facility in Idaho, namely about 1 over 1,600, okay, if you can convert that to scale -- one sixteen hundredth of the volume scale to a large PWR.

JUDGE BUCK: Volume scale, that would be about right.

MR. SHARON: The facility is modeled after the German version of the B&W facility; namely, it is a raised loop configuration as opposed to the lowered loop

configuration of say TMI and most of the B&W operating plants. It has one loop as opposed to the two loops, and it does not have any active reactor coolant pumps, and it does not have what we call a core simulator as we understand a bundle of electrically heated rods.

Our investigation of the facility has indicated that we believe that while a facility will produce some initially useful information, namely greater insights into the behavior of the B&W plant, for the longer term we do not think that the data coming from the facility will be sufficient to satisfy our needs, and that either perhaps an upgrade to that facility would be required to add such items as a second loop and active pumps and perhaps change the configuration to a lowered loop, or that perhaps another facility somewhere else should be constructed to obtain the data.

JUDGE BUCK: In the meantime am I right that what we're left with is the operator training to follow certain procedures in the case of a requirement for say a feed and bleed or something like that, is that correct?

MR. SHARON: The operator procedures as supported by the present analytical models.

JUDGE BUCK: Right. That's basically what we're left with if the plant ever got into such a

situation, is that correct?

MR. SHARON: Correct.

JUDGE BUCK: Does this apply to all B&W plants essentially?

MR. SHARON: Yes.

JUDGE BUCK: Have you reviewed the procedures that are proposed by the B&W group?

MR. SHARON: I haven't personally, but a member of my staff is assigned and has reviewed these procedures.

JUDGE BUCK: Is he satisfied with those?

MR. SHARON: We are basically satisfied that the procedures should, okay, if followed absolutely correctly -- not absolutely, but if followed by the operator, provide us with sufficient assurance, okay, that the operator should be taking the right steps. However, the steps that are stated to be taken in these guidelines are, in many respects, derived from the analyses. So the guidelines to an operator are in many respects only as good as the analytical models and tell us how the plant would behave under these circumstances.

JUDGE BUCK: And that's the best you have at the moment?

MR. SHARON: That's the best we have at the moment.

JUDGE BUCK: And I gather you don't have too much doubt about these things. You've got some doubts, but you're not -- you don't believe it's a 50/50 chance or a 25 percent chance that the models are right?

MR. SHARON: I think we have looked at the models to the extent of saying well, what if we were wrong, okay, what could possibly go wrong. One area we looked at was what if the steam bubble in the candy cane would not condense immediately. One can argue that the system would repressurize until you reached a safety valve set point, and with the HPI flow and the safety valve flow, one could conceive of enough coolant being injected into the primary system to keep the core cool until one could eventually restore -- one could eventually condense the steam bubble and restore natural circulation.

So we have tried to bound what could go wrong, and we have concluded that although perhaps we are pushing the plant to a beyond design basis condition, we do not come up with anything that is totally unacceptable from the standpoint that the core will uncover an unacceptably heat up or anything.

JUDGE BUCK: Okay. Thank you. I may get you up here in a minute, but just hold on just a second. If you'll just give me another minute, Mr. Cutchin.

(Pause.)

JUDGE BUCK: My next problem is the one about system interaction. All I have there is that during the hearing the Staff gave some rather glowing descriptions of a program that would be proposed about going into a big program or study of system interaction. I don't know how much the Licensing Board depended upon that, but now we have the information, Mr. Conran's affidavit, that this program was something that was far beyond what they had thought and that their eyes were considerably larger than their stomachs, shall we say, and that that program has been seriously reduced and perhaps stopped altogether.

Now, as I say, I don't know how much the Licensing Board relied upon this thing, but I would ask you first of all, does this mean that all systems interaction study is stopped?

MR. CUTCHIN: I only know what I read in Mr. Conran's affidavit.

JUDGE BUCK: Don't you get that impression from the affidavit?

MR. CUTCHIN: One could get the impression that for the time being everything had stopped pending a management consideration as to what area to go into next. And I would say that would merge, if you will,

the so-called probabilistic risk assessments of the type that the licensee in TMI was doing with the more detailed systems interaction study. Previously they were looked at as separate.

JUDGE BUCK: I would hardly approve a review of the program that was initially proposed because of the totally unrealistic extent, as I see it. But I just worry about the statements in Mr. Conran's affidavit that this is the end of systems interaction studies of any kind.

MR. CUTCHIN: I don't guess I read it that way, sir.

JUDGE BUCK: Maybe I'm used to reading between the lines.

(Laughter.)

MR. CUTCHIN: That's possible, sir, but I understood him to say it's now in a hold situation, if you will, pending a management determination as to what direction it ought to go into. And I guess they were cutting back on the funds, as he used the term, de-obligated or pending a final decision on the most appropriate alternative. I understand it to be that it is now --

JUDGE BUCK: If Mr. Conran's affidavit is to speak for itself.

MR. CUTCHIN: Yes, sir.

JUDGE BUCK: Now, on Mr. Jensen's affidavit, he has a lot of fun with his 20-minute time to start the emergency feedwater, and sometimes he mixes up minimums and maximums in this thing, but I still don't really have an answer whether the Staff agrees with the Licensee that the leak or a leak in the suction side of the pump would result in "somewhat shorter length of time than 20 minutes for the operator to get the emergency feedwater started."

Do we have an answer for that?

MR. CUTCHIN: We have Mr. Jensen here, sir.

JUDGE BUCK: Well, that may be the best one to get up here then if that's the case.

MR. CUTCHIN: Walter L. Jensen of the Nuclear Regulatory Commission staff.

MR. JENSEN: Let me have another try at explaining this. I've tried several times.

JUDGE BUCK: Well, Mr. Jensen, I think one of the things that got involved here, we got involved in your affidavit with the amount of water -- well, first of all you started off by a different height, and I couldn't see that at all. Then you got into it would leak a greater amount of water, when what we're really concerned with here is the amount of time involved.

This is the maximum amount of time now that the operator has to get that water going.

MR. JENSEN: Perhaps the problem here is the difference between the analyses that were done by B&W and the Three Mile Island procedures. There were two analyses done by B&W in their May 7th package -- that was May 7th of '79 -- and they had a complete loss of feedwater in which the operator -- a complete loss of feedwater with the small break LOCA in the pump discharge and which the operator in 20 minutes in one case took action to turn on the high pressure injection system and initiate feed and bleed, and in another instance they took action to turn on the emergency feedwater system and then let the system depressurize so that I believe nine minutes later the makeup water of the HPI came on and added water to the system.

The difference here is between these analyses and the procedures. The procedures require that the operator if he loses feedwater for either a small break LOCA or just a complete loss of feedwater with our LOCA, that he immediately turn on the high pressure injection. And this system has the capability of matching the core boiloff to prevent the core uncovery. Then he doesn't have to wait.

JUDGE BUCK: You're saying the system is for

him to turn on the HPI rather than the emergency feedwater.

MR. JENSEN: Turn on the HPI first to be sure the feedwater is being supplied to the core and then go off and try to fix the emergency feedwater and get that going to depressurize the plant.

JUDGE BUCK: Okay. I thought there was testimony in here where you got a leak, and if you didn't turn on your emergency feedwater you would eventually get HPI on.

MR. JENSEN: Yes, you would.

JUDGE BUCK: But the period of time that you had available to turn on the emergency feedwater was what was concerning us as to whether it was 20 minutes or whether it gets down to 10 minutes or what it is.

MR. JENSEN: Yes, sir. We think he has 20 minutes if he turns on his high pressure injection right away, or within 20 minutes, and then goes off. I guess the maximum time to turn on his high pressure injection and the emergency feedwater both is 20 minutes. We think the core would not be uncovered for that condition.

JUDGE BUCK: You have to turn them both on?

MR. JENSEN: Both on. That's the procedure to tell them to do.

JUDGE BUCK: Is this now dependent on where

that leak is, whether it's in the head side or the suction side?

MR. JENSEN: Yes, sir. Whether it's in the discharge or the suction. If it's in the discharge you might lose more water because of the --

JUDGE BUCK: Would he lose it more quickly?

MR. JENSEN: He would not lose any more water around the region of the core no matter where the break was. However, if the operator acted as was assumed in the analysis and only turned on the emergency feedwater, we think that he may have less time than 20 minutes.

JUDGE BUCK: By how much, do you know?

MR. JENSEN: I don't know, but I don't think that's important. Just have the procedures tell him to turn on both systems. First, the HPI to provide the makeup water back into the core, and then to try to fix the emergency feedwater.

JUDGE BUCK: But you can't give me a guess as to how much less time he might have? I don't know why he would take all this time, but I'm just trying to find out what is the difference here, because there was a difference that came up in B&W's analysis and in yours.

MR. JENSEN: Yes. B&W -- of course, they did not do an analysis of the break at the pump suction. They only did the break at the pump discharge. And

neither have I done one at the break suction. That would be a fairly expensive analysis to do because the problem time would have to run out about an hour, and it would take a lot of -- it would be very expensive on a computer.

JUDGE BUCK: Have you or anyone else on the Staff done a discharge side analysis, or have you just reviewed the B&W analysis?

MR. JENSEN: We've just looked at the B&W analysis. We don't see anything wrong with the model. It was basically the model that is used that's been approved for Appendix K analysis.

JUDGE BUCK: All right. Hang on for just a minute and I'll see what else I have here.

(Pause.)

JUDGE BUCK: All right, let me go to your answer to question 4E, which I am not sure I really understand. You say the redundancy requirements for the PORV and the vents are similar. The vents, meaning the safety relief vents, of course. Can you explain to me what you mean by similar?

MR. JENSEN: Yes. What I am trying to say here is that NUREG-0737 requirements requires that there be two valves in series for each vent location, say, for the top of the hotleg U-bends or the pressurizer, but not that there be two sets of valves at each location.

Again, the PORV coupled with the block valve also provides two valves in series.

JUDGE BUCK: The argument was brought up this morning by UCS that these are not similar because in the case of the vents, you have two safety grade valves available in series, and with the PORV and its block valve, only the block valve is possibly safety grade. Is that a different situation as far as you are concerned or not? And if not, why not?

MR. JENSEN: It is somewhat different because this isn't really redundancy but in terms of being needed after an accident, the PORV -- neither the PORV nor the block valve is needed to mitigate accidents.

Whereas, the highpoint vents would be needed in some types of situation to relieve hydrogen after some severe incident of core damage. So they should certainly be qualified for a different environment.

JUDGE BUCK: You say PORV is never used for an accident relief?

MR. JENSEN: Not at Three Mile Island. Let me back off. It may be used; it is not relied on as a safety-grade system. There are safety-grade systems that are available to protect the plant, and those procedures may call for the operator to utilize the PORV to mitigate an accident. If the PORV fails, there are still sufficient safety-grade systems to protect the core.

JUDGE BUCK: Such as what?

MR. JENSEN: The high pressure injection system and the emergency feedwater system is being upgraded to safety grade. The reactor protection system.

JUDGE BUCK: It is your view, then, that the vents -- the upper leg vents, for example, are not needed for steam release or bubble release of steam, and only for hydrogen?

MR. JENSEN: We are not really sure what effect the vents would have on relieving steam. The highpoint vents are fairly small; they are designed to

be small so that their failure would not cause a LOCA. And since they are small, they can't relieve a great amount of steam; they can only relieve a small percentage of the steam that would be generated by the core if the core were boiling in some LOCA condition.

JUDGE BUCK: Supposing that it isn't boiling. You have a bubble up there due to depressurization or some such thing as this -- sudden cooling. You don't think that the vents would be of any use for that?

MR. JENSEN: Yes, they may be. The vents could slowly relieve any steam trapped in the candy cane perhaps over a matter of hours.

JUDGE BUCK: Let me refer you, just for the moment here if I may -- do you have available there Eisenhut's letter. May I have it here. Hold on a minute.

(Pause.)

On an enclosure with that letter, -- this is the March 25th, 1982 letter by Darryl Eisenhut to Mr. Maddengill of the B&W owners group. In an attachment to that, he discusses interruption of natural circulation. He talks about the steam entrapment at the top of the hotleg during small break is predicted to interrupt natural circulation flow. The ability of the code to predict and calculate this phenomenon should be

addressed.

Wouldn't the vent valves be sufficient to relieve a bubble of that nature?

MR. JENSEN: If a bubble were trapped in the candy cane so as to prevent natural circulation, and it was not added to by boiling in the core, -- of course, if you have no natural circulation it is likely for the core to react to pressure and temperature in the system and increase the boiling. But if there were no boiling and just the bubble were trapped, the vents would relieve the bubble.

JUDGE BUCK: But you think it would be too small?

MR. JENSEN: I don't know. It would take a long time. It wouldn't be something that would occur immediately; it would take several hours of the vent being open to relieve the bubble, depending on the bubble size, of course.

JUDGE BUCK: Well then, I had a letter here this morning in which -- let's see, where is it. The applicant was quoted by someone on the staff. The applicant was going to train his operators how to use the vents to relieve steam, which doesn't tie in now for the fact that they are too small to do any good.

MR. JENSEN: I wouldn't say they won't do any

good, but I am not sure. I think maybe this is where we might like to see some test data, to know how effective they would be. And if I were the operator and I lost natural circulation, I suspect a good thing to do would be to open the vents and take whatever good that will do.

JUDGE BUCK: Okay.

(Pause.)

I think that is all I have. One question I had is concerning the exit thermocouples in connection with the saturation meter, and the problem somebody raised about the fact that these are not environmentally qualified. I believe that is Mr. Phillips' affidavit.

MR. CUTCHIN: In whose affidavit, sir?

JUDGE BUCK: It is in answer to 4H; I believe it is Phillips.

MR. CUTCHIN: That would have been in connection with inadequate core cooling.

JUDGE BUCK: Yes. What I want to know is what the staff feels about the problem that has been brought up on the exit thermocouples, and their environmental qualification.

MR. CUTCHIN: It is my understanding, and I again may have to -- I don't have very much gas in any of these areas, it appears, but we are going into new information beyond what we discussed in detail at the

hearing.

But it is my understanding that for the use that these instruments would be put, it is a well beyond design basis event. So the staff is looking to have available any and everything that might be useful, but has not yet imposed the full requirement to make them all safety grade. Is that a correct statement?

(No response.)

That is my understanding.

JUDGE GOTCHY: I guess the licensee was not the only party that was surprised by your May 20th brief on the question of water level indication urging us to accept licensee's exception 1. I was curious -- if the only reason that the staff has for urging acceptance of their exception 1 is the conclusion that the Licensing Board used an improper standard in its decision to require level instrumentation, is that the only reason?

MR. CUTCHIN: Yes, Dr. Gotchy. If one is using the staff's definition of necessary, which does not include things that are desirable but not necessary, then on that definition the staff is saying that it would concede that it would lose. However, if the Board is interpreting the term "necessary" to include both those things that are necessary and those things that are desirable -- and I obviously did not make that clear

enough in my initial remarks -- then the staff is of the view that this instrumentation is desirable, and one might even put adjectives on the "desirable."

But the staff has not been able to support in its mind that these -- this additional instrumentation is that without which they must say it is unsafe to allow the operate. But they still are pressing hard, and the Commission, in fact, has asked the staff to provide them with some additional information aimed at supporting a requirement that B&W install their instrumentation on all their licensees.

And that is the subject of not only the March 16, 1982 document that I referred to, but there is an additional document that went to Mr. Stello from Mr. Denton dated as recently as August 18, 1982, which was for the purpose of responding to questions that grew out of the generic requirements review committee review that took place after the first document.

But the staff does believe that this additional instrumentation ought to be made available. They believe it is desirable, as I defined that term, but they cannot take the position that it must be there or the plant is not safe to operate.

JUDGE GOTCHY: Is that true for both the short term and the long term?

MR. CUTCHIN: For the short term, there is no argument. The staff had agreed that there was sufficient information and the procedures were sufficient to use that information, and they saw no use for the additional information in the procedures. The only argument was as to any additional information instrumentation beyond that required by the first part of the NUREG-0578 -- 2.1.b I believe the item was.

JUDGE GOTCHY: In the PID, the Licensing Board, I think there referring to Dr. Ross's testimony, still believe that the use of water level instruments are primarily for use for -- if you want to put quotes -- "anomalous undefined episodes."

MR. CUTCHIN: I believe that is still the staff's position. They believe that if there is a possible use for that kind of instrumentation and it can be installed, that the instrumentation ought to be there.

JUDGE GOTCHY: Judge Smith in his separate staement -- I think it is paragraph 702 -- concluded that these anomalous undefined episodes would be "within a TMI transient." Do you agree with that?

MR. CUTCHIN: I have to confess that I am not sure I understand what Judge Smith is saying.

JUDGE GOTCHY: If this Board decides in favor of licensee exception 1 on what appears to me at least

as a technical member, to be a legal technicality -- in other words, the use of improper standards -- are we then giving the staff another opportunity to take its case to the Commission and prove it on a generic basis, and then with Commission approval, later impose water level instrumentation at TMI-1?

MR. CUTCHIN: That was the crux of my statement, Dr. Gotchy. Depending on the definition of "necessary" that this Board uses, if the Board uses the staff's definition, then the staff believes that it has complete freedom to go forward to the Commission and impose it on a generic basis as desirable on the basis of showing some safety basis for the requirement.

JUDGE GOTCHY: I presume that at the time you would do that, you would be somewhat less restricted than you were in the TMI-1 restart hearing; namely, you are not just stuck on showing some kind of a nexus to the TMI-2 accident; you would go and use any of the data, including many of the research results.

MR. CUTCHIN: Any research results, in my opinion, could be used.

JUDGE GOTCHY: Going back to licensee's argument in its March 10th brief, I just wanted to confirm that this is the case. I would just like to read you a couple of quotes here and I would just like

to have you respond to them as to is that still your current understanding.

At page 40 in the brief, they said, "There is still the possibility that the staff ultimately would conclude that no system proposed to measure water level is acceptable." Is that still your understanding of the staff's position?

MR. CUTCHIN: My understanding is that that is a possibility but an extremely unlikely one because of the fact that the staff already believes that there are certain systems that could fill this need; for instance, the Combustion and the Westinghouse ones, but they haven't been shown to be usable on the B&W plant yet.

JUDGE GOTCHY: Another statement was, "To be acceptable, the system will have to provide an overall enhancement to safety." Is that still true?

MR. CUTCHIN: Again, it says there must be some safety basis for the requirement.

JUDGE GOTCHY: And finally, "Staff will not make such a determination until the systems are installed, the operating methods have been identified, the calibration test data available, and the staff is certain that these systems are, indeed, a plus to safety and will not lead to unsafe conditions."

MR. CUTCHIN: I have not heard the staff

change that position, either.

JUDGE GOTCHY: You are probably the wrong person to ask this, but are you aware of any attempts by the staff to establish actual tests of proposed water level instruments at some of the other test facilities or that sort of thing?

MR. CUTCHIN: I am not, but I could turn to someone and have him speak to it. Dr. Mattson could speak to it.

MR. MATTSON: Repeat the question, please?

JUDGE GOTCHY: Does this -- has the staff made any plans to do some actual tests of proposed water level instruments at some of the experimental research facilities, like LOFT or anything like that?

MR. MATTSON: My name is Roger Mattson from the staff. We have tested the Westinghouse system in LOFT in SEMI-SCALE and the Combustion Engineering system has been tested in the facility at Combustion Engineering. There will also be some testing of the as-built systems in some of the lead reactors. Salem, for example, I believe will be one of the first Westinghouse plants.

JUDGE GOTCHY: Thank you, sir.

JUDGE BUCK: Excuse me, wait a minute. I would like to ask are there any ranges in which these

meters that have been tested show ambiguous readings?

MR. MATTSON: That has been the crux of the Commission's concern over the requirement.

JUDGE BUCK: That is not my question. I want to know are there ambiguous readings?

MR. MATTSON: Yes, there are areas where there are potentials for ambiguous readings. However, in the course of the last year we have spent a lot of time analyzing and researching with experiments those regions so that we can either redesign the instrument or require it to be redesigned or change the training or procedures for its use to remove the ambiguity.

JUDGE BUCK: How many of these instruments has the staff already had licensees put in?

MR. MATTSON: We have allowed people who have purchased the Westinghouse and Combustion Engineering systems to install them at their risk. We have told them that we will eventually approve those systems subject to certain fine tuning, if you will, of the final requirements. I believe the number in the case of Westinghouse is in excess of 25 plants. In the case of the Combustion Engineering system, if my memory serves, San Onofre 2 will be the first unit, and that will be at the first refueling.

JUDGE BUCK: Is that a requirement on a

long-term basis?

MR. MATTSON: They are required to be installed. The question was whether people could go in ahead and put in equipment that they wanted to install, given that we hadn't given final approval yet. We said yes, they could at their own risk, knowing that the risk was small because we were highly likely to approve them.

JUDGE BUCK: How did you know you were when you hadn't tested the instruments out in any reactor at all?

MR. MATTSON: We had tested them in facilities at Idaho at Combustion Engineering.

JUDGE BUCK: And they got ambiguous readings.

MR. MATTSON: No. On close scrutiny by the Advisory Committee for Reactor Safeguards and on some operating reactors it was found that there were remote possibilities of some ambiguous indications. We have worked on those areas in the last year and we believe, as explained in the document that Mr. Denton sent to Mr. Stello, just referred to, that we have sufficiently removed those ambiguities for the Combustion Engineering and Westinghouse.

JUDGE BUCK: What do you mean, sufficiently?

MR. MATTSON: So that there is an overall benefit to safety that you are adding more to safety

than you are subtracting.

JUDGE BUCK: How are you going to do that if you had ambiguous rea[illegible]ngs? How thoroughly has this been tested? It just bothers me to think that all these systems have been put in under your insistence and there is still a possibility --

MR. MATTSON: No, sir, that is not true.

JUDGE BUCK: Yes, it is. Long term.

MR. MATTSON: There are reactor operators who have designed, built, installed and want to operate their own systems because they believe they are important to safety. There is a wide spectrum of opinion in the industry as to the utility of these devices. On the one hand, you have the B&W owners who are nearly unanimous as to their lack of utility. On the other hand, you have other utilities that want them installed, want them turned on, want them to protect their equipment, that we are not yet allowing them to be turned on.

So it is not just our insistence. Furthermore, there is a vast body of information now, both experimental and analytical and procedural, a lot of testing and procedures, a lot of testing in facilities that shows that there is a net benefit to safety. Confident of that, --

JUDGE BUCK: What do you mean a net benefit to safety?

MR. MATTSON: That this instrument can provide insight to inadequate core cooling not available from any other instrumentation in the plant.

JUDGE BUCK: What particularly?

MR. MATTSON: The timespan between the loss of indication from subcooling meter, and the first appearance of information from the superheat in the core exit thermocouples. That time period for small break LOCAs can be as long as hours, three, four hours long. It is a time period --

JUDGE BUCK: What is your saturation meter doing in the meantime?

MR. MATTSON: It shows saturation.

JUDGE BUCK: Doesn't that bother you? Doesn't that cause the actions necessary?

MR. MATTSON: That is exactly the point.

JUDGE BUCK: You are supposed to--

MR. MATTSON: Let me give you an example. Let's say a small break LOCA -- I don't know its size because I am unable to measure the leak flow in the BWR. It is sufficient to saturate the area of both the core, but not sufficient yet to uncover the core. That is, the froth level hasn't decreased below the top of

the core.

In that span, which can be three hours or more long, for a small break LOCA, it is reasonable to expect that the reactor operator would be taking some actions. He would be manipulating pumps, he might be manipulating valves, he might be manipulating the secondary system. He would know the system is saturated, he would know that subcooling is not reappearing; it stays saturated.

So, he would be trying to return it to subcooling. Now, not knowing the combination of failures that got him to that situation, it is hard for us to sit here today and decide exactly what those manipulations would be. But over a period of hours, there would be such manipulations before the appearance of superheat to tell him whatever manipulations they had undergone that were wrong, it could be a long period of time; a lot of guesswork could occur during that period.

We think it is necessary to penetrate that window with an instrument. That instrument is the water level or an inventory level for reactors.

JUDGE EDLES: The point is the argument you are making in favor of the instrument is if the staff proceeds to apply it generically.

MR. MATTSON: I think that is Dr. Buck's point. It is a point with which I agree if I understand

it. That is, the procedures as written, using the instrumentation that is there today, should be adequate to cool the core if the operator does what he is told. But one of the lessons is operators may not do what they are told. Is it cost effective to give them more information? That is the basis upon which this requirement is being considered.

JUDGE BUCK: I don't understand why you say it is cost effective if you have to wait three hours after you have got a serious situation of saturation for your water level meter, and then you call that safety cost-effective? You are sitting around for three hours doing nothing. If the saturation meter hadn't been there, you wouldn't even know that.

MR. MATTSON: The saturation meter is already installed and required.

JUDGE BUCK: I know that. You are relying on the saturation meter. Fine, you know you are saturated. Now for three hours you fiddle around and you don't do the right thing and you have to depend upon your water level meter. What indication do I have that you are going to do the right thing then?

MR. MATTSON: But this is a distinction between necessary and desirable. It is not necessary to have a water level indicator to tell the operator what

the right thing is to do.

JUDGE BUCK: How do you tell him the right thing to do?

MR. MATTSON: If the system is saturated, he should turn off the pumps available without the water level indicator.

JUDGE BUCK: Without the water level indicator he knows the system is saturated?

MR. MATTSON: That is right.

JUDGE EDLES: Mr. Cutchin, let me ask you this. I understand the difference between necessary and desirable. Are you and your colleagues urging us that if we find somehow desirable is also necessary, you are urging us to approve the Licensing Board's decision insofar as these meters are concerned?

MR. CUTCHIN: I want to be sure I understood that.

JUDGE EDLES: I understand the argument you are making which is not to support the Licensing Board's position in connection with this. But we have spent an awful lot of time now explaining the virtues of this meter.

I guess what I am trying to get at here is are you implicitly trying to tell me that if we could somehow expand "necessary" to include "desirable," we

ought to reject the licensee's exception?

MR. CUTCHIN: No. If you define necessary to include desirable, then you should find as the Licensing Board found. If you define necessary as the staff is espousing in their position, then you need not find in licensee's --

JUDGE EDLES: Your bottom line at this point is that we ought not require the additional instrumentation?

MR. CUTCHIN: As necessary, as defined by the staff.

MR. MATTSON: In case there is any misunderstanding --

JUDGE BUCK: What if it is not necessary or desirable?

MR. CUTCHIN: That is a question I don't think either the Licensing Board or the Appeal Board had that delegated to them. That was another part of the staff's argument.

JUDGE EDLES: I understand the question and your response to it. Are there any other questions?

(No response.)

You can take your full five minutes if you want for rebuttal.

MR. BAXTER: I don't have any rebuttal.

JUDGE EDLES: You have 20 minutes left for rebuttal, Ms. Weiss.

REBUTTAL ORAL ARGUMENT ON BEHALF OF INTERVENOR

BY MS. WEISS

MS. WEISS: Your Honors, there is a great deal of essentially new testimony given oin the past hour or hour and a half or so about the small-break LOCA model and the procedures and that stuff is not in the record. The size of events, how long it would take to get the steam bubbles out of the top of the candy cane, that is not in the record.

In fact, you know, we are sitting here puzzling about Mr. Jensen's claim that the procedures for just loss of feedwater call for initiation of HPI. We are not able to verify sitting at the table that that is the case. Those are complicated procedures, and we have spent a lot of time on them at the proceeding, or what procedure it was that he was referring to.

Also, fundamentally, and I guess all of what Mr. Jensen was saying about the analyses of how the plant will respond are based upon the very same models that it has been indicated in the attachment to his affidavit that March 25th letter to the B&W Owners Group has some very fundamental deficiencies at the very least. It cannot be verified it adequately predicts plant behavior under certain conditions.

By way of saying that, there is an awful lot

that I simply cannot respond to of what has been said today. We did say to you when we responded to the replies of the other parties to your questions that we are of two minds. We, of course, are encouraged because of your interest and we know you want to resolve these things, and that is important.

On the other hand, we are very concerned that findings not be based on information that we have not been given the opportunity to probe. I think the record will show clearly that some of these statements, this was certainly the generality and the force with which they were initially made can be substantially eroded when they are subject to probing.

With respect to the question that Dr. Buck put his finger on about --

JUDGE EDLES: Excuse me. May I ask a quick question? What procedures or what are you asking me then to do with respect to what has gone on in the past? I can assure you that we will not in our findings rely on matters outside the record. I appreciate your concern in that regard.

MS. WEISS: If you are not going to rely for your findings on matters that are outside the record to base your decision on, then I suppose I do not have any reason to complain. Then I sort of wonder what it has

all been about. But I suppose as a matter of law I do not have any reason to complain in that case.

In any case, the question of how can you be claiming that 50.46 is met when at the same time the documentation that Mr. Jensen has attached to his affidavit indicates very serious problems with verifying the accuracy of the B&W small-break LOCA model. GPU refers to this as "long-term model refinement." The Staff refers to it as "long-term model confirmation," and it is consistent with the position that 50.46 is met. But we are just looking further for the purpose of developing new procedures and training.

I think if you look at the March 25th letter to the B&W Owners Group, you find that the fact is that the B&W small-break LOCA model cannot be verified to predict fundamental phenomenon of plant behavior. The B&W small-break LOCA, the original small-break LOCA model, did not encompass the break size that actually occurred at TMI-2. It had to be changed to address plant behavior for smaller breaks.

It is this changed model that is unverified. Among the things that cannot be verified are the extent to which interruption of natural circulation is modeled, hydraulic stability after the accident, cooldown and depressurization after the accident, and a number of

other critical questions that need verification in the model.

In our view, that shows that the model can be relied on to analyze the behavior of plant equipment or to develop the procedures which fundamentally depend on the analysis. GPU and the Staff would still like you to believe that this does not undermine the conclusion that the rules are met.

In my view, that is playing "let's pretend." There is no support for the proposition that it accurately predicts the plant behavior under the entire spectrum of small-breaks. I think fundamentally what they are saying to you is, we approved it before and we did not know at that point what we know now, but it would be really stirring up a hornet's nest to concede that that approval was wrong.

I want to respond -- and I guess this may get a little disjointed because these things do not necessarily come in order -- to the Licensee's point on emergency feedwater reliability, its attack on that portion of the Licensing Board's attention to that question. They claim that the Board ignored what they referred to as the "qualitative judgments." I do not that is the case.

But the GPU's proposed way to remedy that is

to plead with you to ignore the quantitative assessments. The fact is the quantitative assessments were produced on the record for cross examination. We all had a shot at it. The Licensee was unable to make a significant dent in those. And there is no logical reason why that evidence should not be considered along with all the other evidence in the case.

With respect to the qualitative side, essentially the position of GPU was, we are making X modifications to the emergency feedwater system and those are enough. And the Staff echoed that.

The question that never got around to addressing is why? Why is that enough? How reliable is the system and why is that enough? We only have the reliability assessment of the TMI-1 emergency feedwater system at restart or after the modification to safety-grade was the Staff's, and they showed that the failure rates of that system are very high indeed.

It is ironic to me that GPU now contests the finding on emergency feedwater reliabilty because it would be the first time that bleed-and-feed would be required to mitigate design-basis accidents. So I think it would be the first time that bleed-and-feed is required to mitigate the design-basis accidents.

It is ironic because the Licensees were the

first to urge the Board that they should be given credit for bleed-and-feed. Moreover, I want to reiterate that even if feedwater is available, bleed-and-feed is needed for a certain range of break sizes, and I do not think that was contested by what anybody said here today.

GPU claimed that there was some unfairness in the focus on feed-and-bleed. The fact is that feed-and-bleed became a central issue in this case precisely because of the Licensee's testimony in response to the ECS contentions, the fact that they always have backup to bleed-and-feed can excuse the existence of other problems in the systems.

It was claimed that CLI 80.21 did not find the old standards for environmental qualification wrong. That was claimed -- did not find the old standards for environmental qualification inadequate. That was claimed with some great force.

I simply read to you from 11 NRC at 711: "It is clear to us that the 1971 standard by itself cannot serve as the standard against which qualification is to be judged. A full description of this 1971 standard and its comparison to the 1974 standard is contained in the Staff's submittal. Briefly, the standard does not specify the accident conditions which the electrical equipment must meet. There are no specific requirements

to maintain document files and no specific requirements concerning margin, aging, and other needed equipment specifications. It is, in fact, a document which briefly and broadly describes how to qualify any equipment electrical or otherwise."

If that is not a statement of the inadequacy of the prior standards, I do not know what is.

There was also a claim that the ASLB did not find that the design violates Reg Guide 1.75. It is late in the day. I am not going to read any more to you. I only recommend that you look at paragraph 767, 768 of the partial initial decision. It speaks for itself.

The Licensing Board did find that the design of TMI for connection of the pressurizer heaters to the emergency buses does not meet Regulatory Guide 1.75.

Well, I think that we have probably reached a point of diminishing returns at this point, given the hour, unless the Board has any questions.

JUDGE BUCK: I have no more questions.

JUDGE EDLES: If there are no further questions on our part, I would like to thank all counsel and others who participated this morning and this afternoon. I thank you both for your assistance and for your patience, and the case will now stand submitted.

(Thereupon, at 4:34 p.m., the oral argument in the above-entitled matter was submitted.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

BEFORE THE ATOMIC SAFETY & LICENSING APPEAL BOARD

in the matter of: Metropolitan Edison Co., et al (Three Mile Island Nuclear Station Unit Nr. 1)

Date of Proceeding: September 1, 1982

Docket Number: 50-289 (Restart)

Place of Proceeding: Bethesda, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Jane N. Beach

Official Reporter (Typed)

Jane N. Beach

Official Reporter (Signature)